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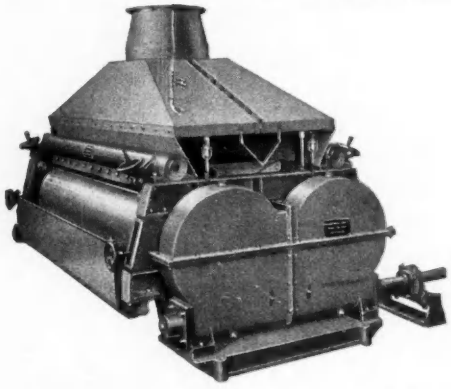

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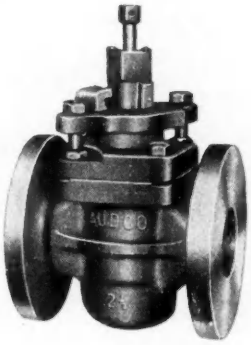

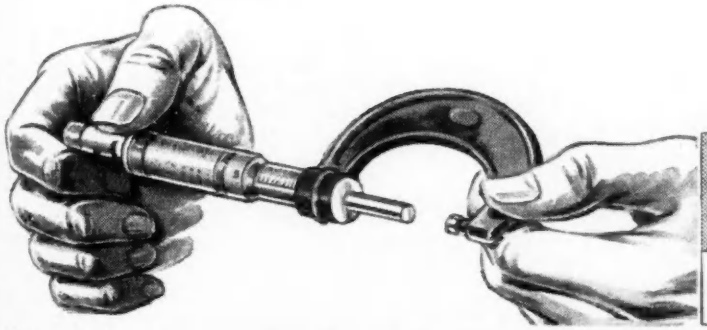

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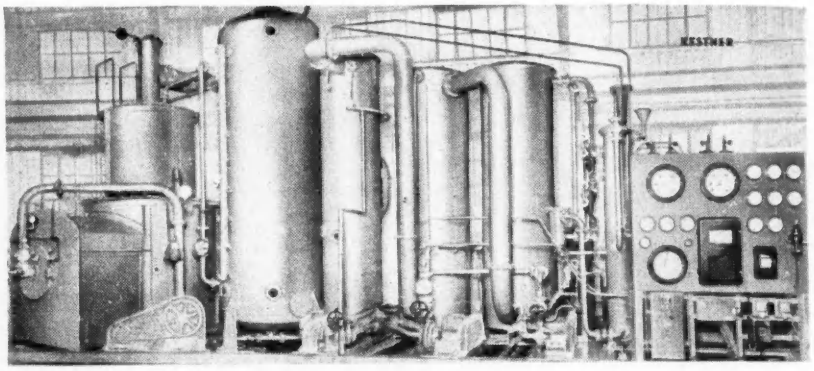

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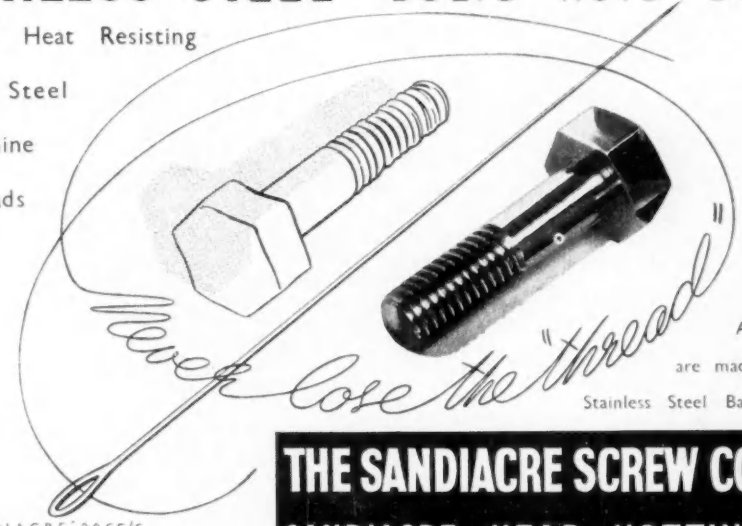

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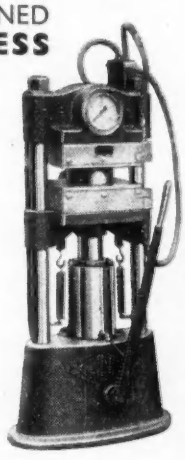

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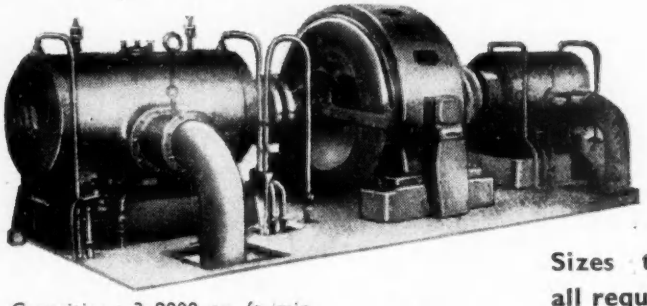

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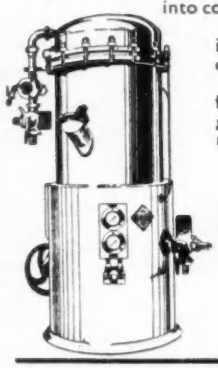

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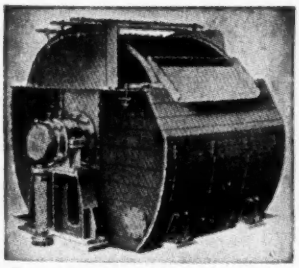

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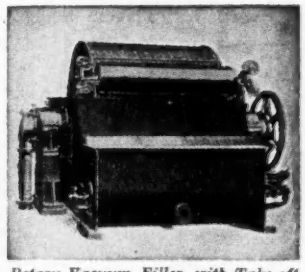

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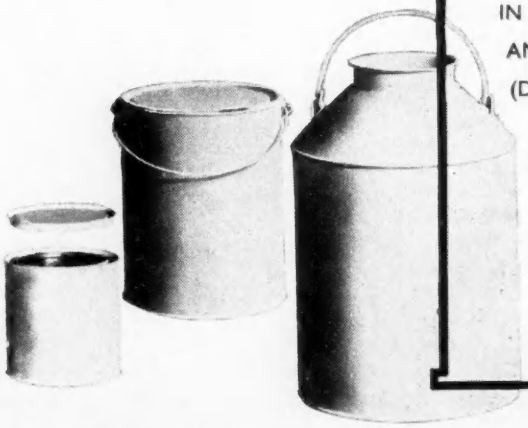

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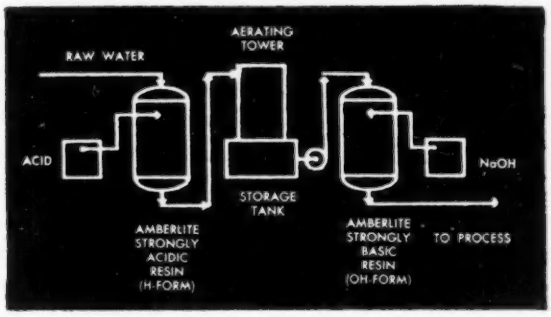

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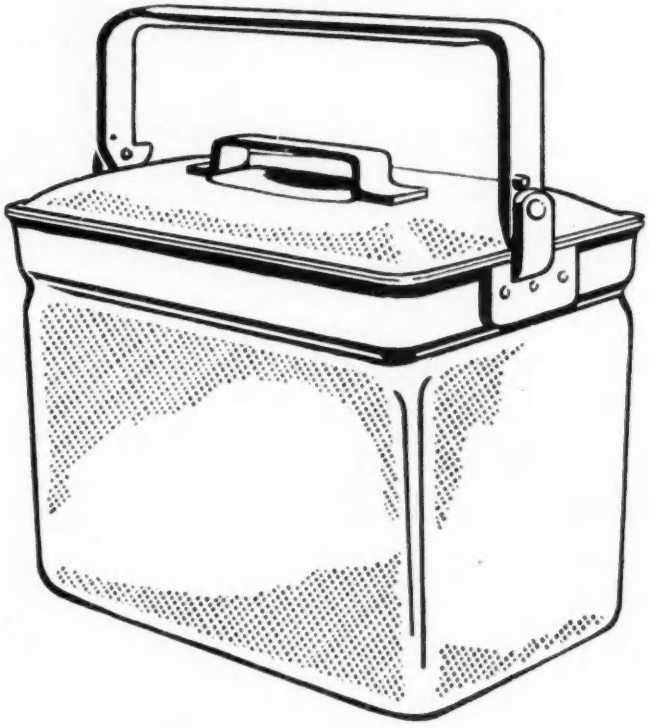

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Volume LXXII
Number 1870

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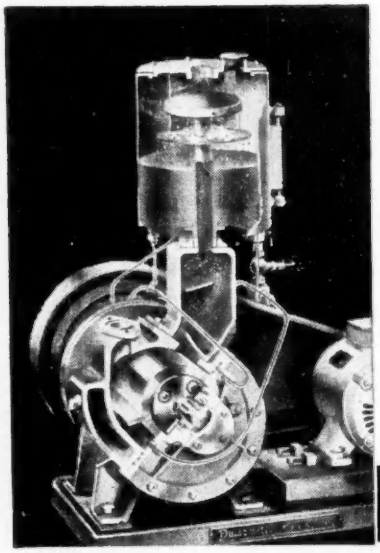

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Answers Without Questions

VARIOUS publications ranging from popular newspapers to serious trade journals offer services of the enquiry bureau kind; to judge many of these by the selections of questions and answers that are printed, there is a steady flow of requests for advice. Miss A. tries to solve some personal conflict between heart and home, Mr. B. seeks a list of safe investments for hard-won savings, and Mr. C. hopes for an improved formula for a floor polish he manufactures. People with problems seem to place considerable faith in publications that they regularly read. Yet it would seem that official and organised technical information services are little used by those who most need them. Knowledge is not in short supply, but queries are.

These comments are prompted by a new OEEC report, the account of a conference held in London last autumn ('Technical Information Services in Europe', April, 1955, 68 pp., HMSO). A great deal that is said in the report has direct application to this country for the 'sample' chosen for much of the discussion was the ready-to-hand sample of Department of Scientific & Industrial Research information facilities.

It would be unjust to give the impression that the reorganised DSIR information services are neglected by industry. A great deal of information is sought and supplied; the creation of an ever-swelling, centralised information office has been deliberately discouraged, and instead a small centralised 'sorting-out' department passes enquiries on to one of the 14 DSIR research centres or to one of the 45 industrial research associations. But what was suspected from the outset of this modern DSIR project has already been confirmed by events—much of the work done is for firms that are in fact quite able to help themselves, and far too little is for those smaller and more backward firms 'whose requirements perhaps are greatest but who are very often unaware that they have a need for information'. The DSIR information service has been driven to the conclusion that it must sell itself to reluctant customers. 'Only in a minority of firms is there an appropriately trained person responsible for looking out for new ideas and making arrangements to have something done about them.'

The opinion is expressed by Dr. D. J. Urquhart that the best publicity for technical information service is technical information itself. The publication of a note that some new product has been developed at a DSIR research centre will lead to questions about it; similarly, showing a new device or product at an exhibition will lead to enquiries. To any sales manager this may sound too trite to have been worth utterance or print. However, it is not quite as simple as it sounds. The circulation of typical answers to technical questions on one subject will not only stimulate kindred

questions but also questions on unrelated subjects. However, this must still form a limited approach. Its strongest effect must be to increase the flow of enquiries from those in industry who are already technically minded—it cannot reach many of the unconverted. Catches cannot be made when the bait is disregarded. 'We seem to have arrived at the stage whereby there is a large transmitting service issuing all sorts of things for industry, yet the greater part of it is without receiving sets.' With only small staff resources, the DSIR Intelligence Division has made most commendable efforts to tackle this basic and obstinate problem.

Sample-surveying small firms produced the information that trade associations kept them up to date. When asked if this was indeed so, no less than 600 trade associations stated that they did keep members up to date with new developments! The DSIR does 'not quite believe all these answers'. We share that uncertainty. With notable and progressive exceptions, trade associations in this country seem almost obsessed with secrecy. Often enough they retreat at shocked pace when opportunities for publicity in their own interests are offered. The DSIR information service is still hoping to stimulate interest in the trade associations, but we fear this may be a slow and thinly-rewarded endeavour. If it is true that many firms are individually backward in technical outlook, the collective or accumulative effect is likely to be even more backward.

Using public libraries to promote the use of DSIR information facilities turned out to be successful when all early indications had seemed dismal. It will in time be far more successful for the main impact has been upon the younger librarians. This has been accompanied by efforts to publicise libraries as media for technical information, a vital complement since firms seldom think of using their local libraries for this purpose. One consequence of this particular DSIR effort has been that questions about DSIR technical information services now make their appearance in the Library Association's qualifying examinations.

A third method is the distribution of 'technical digests', a new DSIR activity scarcely one year old. In the first seven months some 70 single-item digests of technical articles or papers were issued. The present policy is not aimed at feeding specialists with specialised material. It is felt that this need is already adequately covered. 'Digests are intended to help the "cross-feeding" of practical ideas from industry to industry.' Output has so far been far smaller than had been expected; but the account given of the method of selecting 'digestible' articles, with its thorough screening procedure at the centre and its subsequent reliance upon expert opinion at various DSIR centres, fully explains why quantity and quality cannot be jointly obtained. These digests—as single-sheet, 200-300 word items usually with an illustration—are batch-distributed to some 200 of the 1,000 trade associations in the hope that suitable items will be chosen for circulation to member-firms. Frankly, we feel that the scale of this particular enterprise needs substantial enlargement if it is to have a significant effect within many years. Small and cautious beginnings are often wise enough, but here the incredibly small output per month and the totally indirect method of distribution are surely tokens of enterprise in reverse. A system of checking the demand has been established and its earlier indications seem to be promising, but how is true 'promise' measured? At a different stage in the Conference, it was said that the supply of information was not followed-up in Britain; 'it is assumed that if no complaint is received the customer has been satisfied'. A strange assumption when the basic struggle is with apathy and complacency!

However, there can be little criticism of the DSIR's efforts to popularise the distribution of technical information, for the problem is one that has been foisted upon them by industry's own indolence. Most of the effort should come from industry, and the incentive should be competition. In any case, the amount of public money that could be justifiably spent in persuading backward firms to make more use of free government services must obviously be quite modestly limited.

Notes & Comments

Polyethylene Revolution ?

UNDER the Hitler regime the German chemical industry gradually lost much of its customary enterprise and ingenuity. With the defeat of Hitler its economic and physical plight inevitably required a long uphill pull for recovery. Meanwhile, leadership in developing new processes belonged mainly to America and Britain. However, in the past year or two it has become obvious that a great deal of the pre-Hitler German share in technological leadership has been regained. Much is said and written nowadays about the re-emergence of vigorous German competition, but new competition with ideas may well prove a bigger factor than direct competition with chemical goods. Here the revived German industry has something of an advantage. It is able to look particularly freshly at new processes developed by America or Britain; it can try to improve those processes without having to go through the years and costs of pioneering. Being late is not always a disadvantage for the future.

Low-pressure Polymerisation

THE polyethylene process may well become a case-history of this kind. It is reported that German research has developed a low-pressure, moderate-temperature process for polymerising ethylene. Moreover, high purity ethylene gas is not essential. This research has been carried out at the Max Planck Institute for Coal Research by Karl Ziegler. A new and undisclosed catalyst, possibly a metallic alkyl in hydrocarbon solution, is said to enable the reaction pressure to be brought down to ordinary atmospheric pressure and the reaction temperature down to 60-70°C. These operating conditions must be compared with present processing conditions—30,000 pounds per sq. in. and about 200°C. The possibilities for revolutionising polyethylene production are clearly enormous. (see *Industrial & Engineering Chemistry*, 1955, **47** [4], 11A).

Licences Issued

THE type of polymer produced is likely to differ from that made by the conventional high pressure process. It is said to be a straight-chain polymer without branches. The molecular weight range of producible polymers is also said to be much wider and with a much bigger maximum. How far the Ziegler process can be commercially exploited remains to be discovered. One German company is said to be building a commercial plant now (see THE CHEMICAL AGE, 1955, **72**, 725 and 990), two others are conducting pilot-scale experiments. An exclusive licence for UK is said to have been obtained by a British oil company, and six licences for US have been reported. The third decade of polyethylene's history may well be highly dramatic.

A Minor Plastics Market

A RECENT New Zealand paper (*N.Z. Journal Science & Technology*, 1955, **36** [5B], 479) may be of interest to producers of acrylic and similar plastics. It describes a new and improved method of preserving botanical specimens for study or museum display, etc. In the year and a half of experimental work developing this method, the material used has been methyl methacrylate. This is dissolved in a suitable solvent; the solution is applied to natural specimens by spraying or dipping. The actual technique appears to vary considerably according to type of specimen. The method will clearly call for skill and experience, but this is common to other practices of preserving biological specimens. The equipment needed is small and simple, however, and the demand upon time and labour is low. As the film on the treated specimen dries, a thin plastics cast is formed. The fast rate of drying 'sets' the natural habit. The translucent cast can subsequently be tinted; although the enclosed leaf or stem shrinks eventually to a skeleton, it gives additional strength to the cast. The New Zealand paper is fully

detailed, and it suggests that plastics other than methyl methacrylate may sometimes give better results, e.g., butyl methacrylate will form less brittle casts for small stiff leaves, or epoxy resins may prove less liable to shrink when large specimens are treated.

Baekeland Memorial Lecture

LEO Hendrik Baekeland & Photographic Printing Papers' is the title of the third of the Baekeland Memorial Lectures being given under the auspices of the Society of Chemical Industry at the Royal Institution, 21 Albemarle Street, London S.W.1 on Thursday 2 June at 6 p.m. The speaker will be Dr. C. E. Kenneth Mees, F.R.S., D.Sc., F.C.S., F.R.A.S., F.R.P.S. (vice-president, and director in charge of research, Eastman-Kodak Company and a director of Kodak Ltd.). Admission is free, without tickets.

Baekeland, born and educated in Ghent, went to New York in 1889 and entered the photographic business. In 1893 he established a small factory to make a new kind of photographic printing paper which he called Velox. Velox was a silver chloride emulsion made by adding silver nitrate to a gelatin solution containing an excess of soluble chloride. The emulsion was made very simply and was not washed. The paper was slow enough to be handled in subdued lamp light and was the forerunner of the so-called 'gaslight' papers.

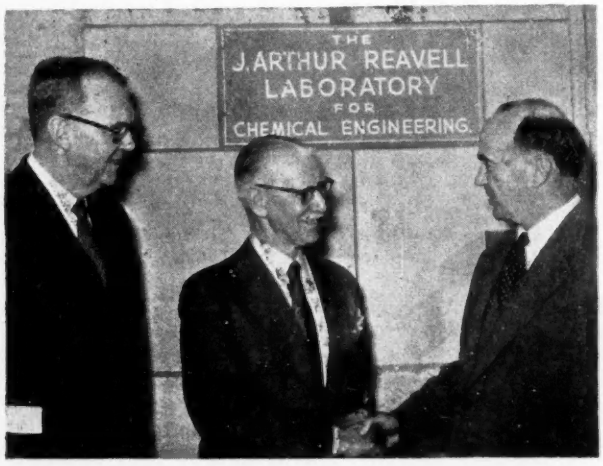
In 1899 Baekeland's company was bought by George Eastman, who transferred the manufacture of Velox to the Kodak factories, where it became the standard paper for the printing of amateur negatives. Thus to the photographic art, Baekeland contributed the use of unwashed emulsions, which are now used throughout the world in a majority of contact printing papers and also introduced papers which could be operated in subdued light and did not require the use of a dark-room.

New SA Laboratories

OPENED in March of this year was 'The J. Arthur Reavell Laboratory for Chemical Engineering' at Witwatersrand University, Johannesburg. Much valuable assistance in this project was given by Kestners (South Africa) Ltd. and W. S. Taylor & Thomas Ltd. Much of the laboratory plant was manufactured locally as the chemical plant industry has expanded considerably in the Union since the war.

The opening ceremony was performed by Mr. Reavell who travelled to Johannesburg at the invitation of the University Council. In his address Mr. Reavell, who is chairman of Kestners, gave an account of the major developments in chemical engineering in the UK from the turn of the century to the present day.

Among those present were Dr. H. J. van Eck representing the Industrial Development Corporation of South Africa, and Mr. P. E. Rousseau of the new oil from coal project, SASOL.



Professor O. G. Backeberg, Professor of Chemistry, watches as Mr. J. A. Reavell (centre) is greeted by the Principal of the Witwatersrand University, Mr. W. N. Sutton

Sulphur To-day

British Sulphur Corporation Issues Report

THE sulphur industry of the United Kingdom is the fourth largest in the world and is surpassed only by the US, USSR and Japan. This information is contained in the eighth issue of the *Quarterly Bulletin* of the British Sulphur Corporation Ltd. At present 89 per cent of the country's brimstone requirements, and practically all its pyrites needs are imported, making up about half of the total sulphur usage. The remainder consists of native anhydrite and recoveries from smelter, coal, and oil refinery gases. The sulphuric acid industry is now less dependent on imported brimstone, but despite increased facilities for the use of indigenous raw materials, an almost equal dependence on imported pyrites has been set up.

The anticipated consumption of sulphur for the UK in 1955 is 1,130,000 tons, of which 340,000 tons will be brimstone, 600,000 pyrites, nearly 1,500,000 tons anhydrite and over 250,000 tons sulphur recovered from waste gases. An expansion of total sulphur usage at the rate of 3-4 per cent annually is expected.

The largest user of brimstone in the UK is the rayon industry which accounts for about 60 per cent of the total tonnage consumed.

Japanese Pyrites

The Japanese pyrites industry is now the largest in the world, with an annual output of nearly 2,500,000 tons; 88 per cent of the sulphur used by the sulphuric acid industry of the country is obtained from pyrites, and this factor largely determines the scope of the industry. Elemental sulphur plays very little part in meeting the needs of the acid industry as pyrites represents a much cheaper source.

The *Quarterly Bulletin* also reveals that in the US the production of native and recovered sulphur in 1954 was the highest on record, totalling 5,872,943 tons, an increase of eight per cent over 1953. Apparent sales were up by 2¼ per cent over the previous year. Producers stock increased by about 200,000 tons to 3,337,086 tons. This represents about 9½ months' supply at present rates of consumption. The output of the Jefferson Lake Sulphur Co. amounted to 433,500 tons in 1954, 15½ per cent more than in 1953. The company's new plant for the recovery of sulphur from H_2S extracted from natural sour gas is believed to have started operations in February and to be producing 130 tons of sulphur per day.

It is thought that the supply position may ease as Mexican sulphur becomes available. Subsidised supplies from Italy may also be obtainable.

The UK Position

The bulletin goes on to discuss in greater detail the position of the sulphur industry of the UK. As already stated the UK has to import about half its total sulphur requirements. The problems which arise are not the overcoming of a shortage, but rather the procuring of supplies under the most favourable economic conditions. The use of indigenous anhydrite has been the largest single factor in reducing the country's dependence on imports. Practical difficulties arise, however, because of the need for siting large units near the source of raw materials and the markets for acid and cement clinker. Under suitable conditions the price of anhydrite acid compares advantageously with acid produced from pyrites. It is thought that the limit, for the time being, has been reached in this field.

In 1951 a conversion programme was inaugurated, by which pyrites acid production was to be increased to about 40 per cent of the total output, while brimstone was to be used merely to provide the balance, which was expected to fall to about 15 per cent of the total by 1956. Plentiful supplies of elemental sulphur have, however, been available and the drop in brimstone use has not been so great. The increased use of the more expensive pyrites has led to a rise of 4-5 per cent in acid prices.

Future Needs

Statistically the present total acid capacity should be sufficient to meet expanding requirements for the next 3-4 years. The need for new plant cannot be excluded, however, as acid requirements may arise in localities not economically served by pre-

sent plant. It seems that under present conditions these plants would use elemental sulphur.

So far, oil and coal gases have played little part in the supply of sulphur, but government measures in respect of air pollution might do much to increase the quantity of sulphur available from this source.

Also contained in the *Bulletin* is an account of the production of sulphuric acid from hydrogen sulphide. Hydrogen sulphide can be removed from waste gases by a variety of methods, including the use of an amine solution or ammonia. The gas so obtained can then either be converted to elemental sulphur or oxidised in two stages up to sulphuric acid. Much work is still being carried out on these problems.

Sulphuric Acid Returns

United Kingdom Stocks Decrease in First Quarter

FIGURES issued by the National Sulphuric Acid Association Ltd. show that stocks dropped from 29,652 tons of 100 per cent acid on 1 January to 24,395 tons on 31 March. Production during the quarter totalled 536,547 tons. This is not strictly comparable to the figure for the first quarter of 1954 (526,932 tons), as this year's statistics exclude all Government plants. Consumption during the quarter was 549,764 tons, nearly 25 per cent being used in the manufacture of superphosphates.

The following tables show figures of production, consumption, etc., during the first three months of the year:

SULPHURIC ACID AND OLEUM
(*Tons of* 100% H_2SO_4)

	Chamber and Tower only	Contact only	Chamber, Tower and Contact
Stock 1 Jan. 1955 ..	29,652	42,049	71,701
Production	164,729	371,818	536,547
Receipts	21,341	37,987	59,328
Oleum feed	—	1,552	1,552
Adjustments	−566	+3	−563
Use	98,429	164,905	263,334
Despatches	92,332	248,974	341,306
Stock 31 Mar. 1955 ..	24,395	39,530	63,925
Total capacity represented	198,400	424,090	622,490
Percentage production	83.0%	87.7%	86.2%

UK CONSUMPTION

Trade Uses	Tons 100% H_2SO_4
Accumulators	2,619
Agricultural purposes	351
Bromine	2,898
Clays (Fuller's Earth, etc.)	3,382
Copper pickling	811
Dealers	3,664
Dichromate and chromic acid	3,657
Drugs and fine chemicals	5,159
Dye tuffs and intermediates	20,956
Explosives	7,656
Export	1,055
Glue, gelatine and size	112
Hydrochloric acid	15,443
Hydrofluoric acid	3,009
Iron pickling (incl. tin plate)	30,818
Leather	1,317
Lithopone	4,357
Metal extraction	1,046
Oil refining and petroleum products	13,746
Oils (vegetable)	3,337
Paper, etc.	1,986
Phosphates (industrial)	163
Plastics, not otherwise classified	8,030
Rayon and transparent paper	68,406
Sewage	2,906
Soap, glycerine and detergents	13,815
Sugar refining	140
Sulphate of ammonia	73,955
Sulphates of copper, nickel, etc.	4,893
Sulphate of magnesium	960
Superphosphates	136,503
Tar and benzole	5,777
Textile uses	5,005
Titanium dioxide	55,077
Unclassified	46,755
Total	549,764

RAW MATERIALS
(*Tons*)

	Pyrites	Spent Oxide	Imported Sulphur	Recovered Sulphur H_2S & Filter Cake	Zinc Concentrates	Anhydrite
Stock 1 Jan. 1955	155,766	141,953	44,809	8,734	55,613	390
Receipts	131,044	68,686	68,232	6,468	67,687	66,961
Adjustments	−229	+2,992	−92	−27	—	—
Use	124,582	69,736	64,991	7,503	48,890	66,113
Despatches*	2,166	7,662	726	387	—	—
Stock 31 Mar. 1955	159,833	136,233	47,232	7,285	74,410	1,238

*Including Uses for purposes other than Sulphuric Acid manufacture.

Unilever's Record Turnover

Increased Sales of Synthetic Detergents & Soaps

THE Unilever Ltd. and NV Groups had record turnover and trading profits during 1954. Turnover of the two groups was £1,437,429,000, exceeding the 1953 figure by £127,308,000. Trading profit was £70,095,000, compared with £61,584,000. Consolidated net profit was £31,854,000 (£25,799,000). The improvement in trading conditions during 1954 has continued into 1955, although at a slower pace, says the annual report. Volume of sales and profits earned so far this year have been satisfactory.

An example of the world-wide activities of the groups is provided in the list of capital expenditure projects approved—to the total of £33,000,000—during the year. These include synthetic detergents plants in England, France, Denmark, Finland and Belgium; a new plant for silicate manufacture in London; and extensions to a soap plant in the Phillipines, an oil mill and edible fats factory in Turkey, and the oleine and stearine plant at Bromborough, England.

Sales of detergents—soap and synthetic—increased during 1954. Not only was the volume the largest yet achieved, but the rate of increase during the year was also one of the highest recorded since the war. Sales of synthetic detergents increased more rapidly than ever before, and they have more than doubled themselves during the past two years. Sales of soap also increased in volume; the increase in the less developed markets more than offset any decline in the sophisticated ones caused by the increased use of synthetic detergents.

Growth in Annual Sales

Sales of all detergents for the past three years were as follows: 1952, 1,217,000 tons; 1953, 1,311,000 tons; 1954, 1,438,000 tons.

Additional brands of synthetic detergents were introduced into 11 countries and into more than 40 export markets. In spite of this, sales of Sunlight soap achieved a new all-time record; the main increase occurred in overseas countries, particularly Indonesia.

Sales of synthetic detergents and soaps increased substantially in the UK and France. In the Netherlands soap powder consumption was down, but there was a big increase in consumption of synthetic detergents. In Germany synthetic powder made further progress, despite competition from soap powders, while toilet soap sales also increased. In Belgium sales of synthetic detergents expanded, particularly after the introduction of an additional brand. In Denmark sales of a new synthetic detergent developed satisfactorily, while in Sweden, where progress was also made, another brand of synthetic detergent was added to the range.

US Consumption Static

Sales in the US expanded, although total consumption showed little change. Most of the increase came from synthetic detergents. In Canada the increase in sales of synthetic powders was not quite sufficient to offset the decline in other sales. Sales increased substantially in South Africa, where a synthetic powder was launched, and in Australia and Indonesia. Larger sales were also achieved in India, despite the imposition of an excise duty on wrapped laundry soaps and toilet soaps. In Israel various difficulties arose, and operations were terminated.

Sales of toilet preparations declined for the second consecutive year, but this was entirely due to reduced sales in the US. The decline in turnover in the US was due to the sale of the Harriet Hubbard Ayer business in that country, the discontinuation of business in home permanent waving preparations and the continued decline in sales of chlorophyll toothpaste. Turnover in the rest of the world increased and so did profits, despite more intense competition in almost every country. Total sales of dentifrice outside the US increased because of the recovery in the sale of white toothpaste.

The high level of industrial activity in the UK provided a favourable background for Crosfield's chemical business and for Price's oleine and stearine business; both had a successful year. John Knights' tallow business and its glue trade also provided higher profits. Sales of synthetic vitamins, which the groups process, increased and profits were satisfactory. Glycerine output also rose, but results were affected by a fall in prices. In France the factory producing

chemicals for synthetic detergents increased both output and profits.

Research during the year concentrated mainly on improving the flavour and texture of margarine and on the development of detergent products. In the UK the research centre at Colworth House has been extended, and this has enabled the scope of food investigations to be progressively widened. At the same time a wide range of investigations into animal nutrition has been established. The new research laboratory for toilet preparations in London was opened early in 1954.

In the Netherlands the building of the new research laboratory at Vlaardingen has now progressed so far as to permit the transfer of research staff from Zwijndrecht. In the meantime, a new wing is being added to it, which will not be completed until 1956.

As in the past, basic research is still confined to the United Kingdom, the Netherlands and the United States. But a great deal of experimental work is necessarily carried out in Unilever factory laboratories throughout the world.

The annual general meeting of Unilever Ltd. will be held on 26 May. The meetings of Unilever Ltd. and Unilever NV will be addressed by their respective chairmen.

Nickel Supplies Grow

FREE world production capacity for nickel is expected to increase by 1958 to at least 450,000 lb., Dr. John F. Thompson, chairman of The International Nickel Company of Canada, said at the company's annual meeting on 27 April. In 1954 the supply was a record 390,000,000 lb., about 40 per cent of which was accounted for by Government stockpiling and defence requirements. The supply of nickel for civilian use was improved, but the complete satisfaction of all civilian requirements was not possible. The company's deliveries of nickel in all forms in 1954 set a record at 282,000,000 lb.

Dr. Thompson stated that International Nickel began exploration in northern Manitoba, Canada, in 1946. Since then, the initial small-scale reconnaissance has been expanded into a large exploration programme centred in the Mystery Lake region. This programme in Manitoba is still being pressed and has reached the stage where it has been decided to carry out exploration underground at the company's Moak Lake property. At an estimated cost of $2,000,000 an exploration shaft is being sunk to a depth of 1,300 ft. with development scheduled on two levels.

A fourteenth element will be added to the company's output in 1955, he said. The first commercial shipment of International Nickel's high-grade iron ore pellets to the steel industry is expected to be made before the end of the current year. Construction of the $16,000,000 pyrrhotite treatment plant near Copper Cliff, which will employ the company's atmospheric pressure ammonia leaching process to recover this iron ore, is proceeding on schedule. The other elements recovered from International Nickel's ores are: nickel, copper, platinum, palladium, rhodium, ruthenium, iridium, gold, silver, cobalt, selenium, tellurium, and sulphur.

New Lightweight Hose

IN response to many requests from the oil industry for a particularly lightweight suction and delivery hose, the Flexible Advisory Service of the Compoflex Co. Ltd. (26 Grosvenor Gardens, London S.W.1) has now produced a new rough-bore hose, known as the Featherweight, which can be used to transport not only petrol, but oil, pure benzole and other chemicals, and water, etc. The new hose, available in a range of bore sizes up to 4 inches, shows a considerable saving in weight in comparison with all comparable types, the weight per foot ranging from 0.65 lb. for the 1½ inch i.d., to 2.9 lb. for the 4 inch i.d. hose.

The new hose consists of an inner exposed supporting wire helix with a fabric liner coated with a specially-developed PVC mix, known as Molene. For use with particular flowants the hose can be fitted with special liners—Polysar, Hycar or Butyl, etc.—instead of Molene. Over the filler of Polysar is a canvas cover, coated with abrasion-resistant Molene, and a further mild-steel helix. During manufacture, the completed hose is steam-cured by a newly-developed process, to bond the materials together and form a fully-laminated wall. This allows the gauge of the two wire spirals to be reduced so effecting a saving in weight without impairing the strength. An added advantage of the steam-curing is that it enables the hose to be used up to 200° F for continuous use.

Electrochemical Research in India—1954

by N. R. SRINIVASAN, M.Sc., Ph.D., M.I.I.M.

ELECTROCHEMICAL research in India during the year under review has centred round the electrolytic production of manganese, beryllium and cuprous oxides, plating of copper and cobalt from non-conventional baths, conductivity and other data on the nature of complex compounds, polarographic studies and the evolution of analytical procedures, electrochemical reactions in extremely dilute solutions and electrolysis with alternating current of various frequencies.

ELECTROLYTIC MANGANESE

India has rich reserves of manganese ores and the production of electrolytic manganese has attracted considerable attention from research teams at the Central Electrochemical Research Institute, Karaikudi, and the National Metallurgical Laboratory, Jamshedpul. Manganese metal has been produced electrolytically in a laboratory canvas diaphragm cell with an electrolyte containing 80 g/l of manganous sulphate, 150 g/l of ammonium sulphate, 0.15 g/l of sulphur dioxide, at a *p*H of 7.2 and a temperature of 32-35° C. A stainless steel cathode and perforated lead anode were employed (1). The optimum conditions for the electrolysis were a current density of 26.4 amps./sq. ft., a bath voltage of 4.64 volts with a current efficiency of 62.94 per cent and an energy consumption of 3.26 kW. per lb. of manganese. The deposit was found to be silver white. An increase in the manganese concentration in the electrolyte resulted in a fall in the catholyte *p*H, a fall in current efficiency and treeing at the edges of the deposit. Experimental work on a pilot plant scale has been successfully undertaken, with a view to utilising the low grade manganese ores in the country, in a lead lined wooden cell with three stainless steel cathodes and four lead silver anodes (2). In a typical test run with a current of 300-350 amp. passing through the electrolytic cell, 9.25 lb. of manganese of 99.96 per cent purity has been obtained from 48 lb. of 30 per cent manganese ore with a current efficiency of 70 per cent. It is reported that the metal recovery can be further stepped up.

PLATING & ANODISING

The electro-deposition of copper on steel from complex triethanolamine baths containing copper oxalate, citrate, tartrate, carbonate and nitrate has resulted in smooth, bright and adherent deposits (3). The cupric ion concentration in all the plating solutions was in the range 10^{-10} to 10^{-13} N and the solutions did not deposit copper on steel by immersion. Different current densities were tried and ranged from 0.2 to 2 amp./sq. dm. with bath voltages of 1.2 to 5.5 V. The cathode efficiency was in the majority of cases between 90-100 per cent but the nitrate bath was characterised by a very low efficiency. The anode corrosion and throwing power were good. In a comparison with the mono and diethanolamine baths it has been shown that the advantages of the triethanolamine baths are low bath voltage and possibility of working at higher temperatures. For routine copper plating a bath has been developed containing 28-32 oz. of copper sulphate and 6-8 oz. of sulphuric acid per gallon of water (4). Addition of 0.25-0.35 oz. per gallon of glue gives smooth and fine grained deposits; 0.15-0.2 oz. of phenol gives hard deposits useful in electrotyping and 0.0015-0.0025 oz. of thiourea gives soft and semi-bright deposits which can be buffed to bright surfaces. A new oxidising salt has been developed consisting of 38-42 parts of sulphur, 20-25 of potassium hydroxide and 30-40 of sodium hydroxide. In lacquering work, 1-2 oz. per gallon of the salt is used at 100-120° F resulting in a lustrous adhesive lacquer finish. The internal stress developed on plating cobalt from a fluoborate bath has been determined from the curvature of the plated brass strip (5). The tensile strength of the deposit is increased by increasing the concentration of the solution, adding gelatine and dipping the strip in cyanide; but ammonium chloride and naphthol decrease it.

Hard chromium plated piston rings increase the life of internal combustion engines. The electrocleaned and anodic etched piston rings have been plated in a solution with a Cr_2O_3:SO_4'' ratio of 70:1 at 51° C with a current density of 4 amp./

sq. in. and a voltage of 5.5. The current efficiency is 13.23 per cent. The average thickness of the deposit is 0.007874 to 0.01221 inch with a Rockwell 'A' hardness of 63-67 (6). In European practice a thickness of 0.003 inch is ordinarily used but to withstand tropical conditions and dust in India a thicker deposit is being tried. A two stage process consisting of a treatment in a halide flux bath followed by a hot dip in an aluminium bath at elevated temperatures has been developed for preparing aluminised steel (7). It has been shown that adhesion is due to mutual diffusion of iron and aluminium and the formation of alloys. In the anodising and colouring of aluminium articles, a cheaper sulphuric acid process has been reported (8). After anodising for 25-40 minutes in a 15-20 per cent sulphuric acid solution using 14-18 volts, the articles are dipped in dye solutions of 1-2 g. per litre, for 15-20 minutes at *p*H 4.0-4.5 and at a temperature of 160-180° F. For bright and lustrous films addition of sodium chloride is recommended. Recovery of 86 per cent tin from tin plate scrap has been reported (9).

PREPARATIONS

In the electrolytic production of beryllium oxide from a sodium beryllium fluoride solution, obtained by leaching sintered beryl with sodium silicofluoride, high current efficiencies exceeding 100 per cent have been encountered (10). With a current density of 5.5 amp./sq. dm., the apparent current efficiency was 109 per cent whereas with 12.94 amp./sq. dm. it was 117.9 per cent. These abnormally high apparent current efficiencies have been shown to be due to impurities of silica, ferric oxide and aluminium oxide accompanying the beryllium oxide and to the electrodeposited hydroxide carrying down with it the complex fluoride by adsorption. Cuprous oxide, an ingredient of anti-fouling paints, has been prepared from copper scrap (11). An alkaline solution of 10 per cent sodium chloride is used as the electrolyte at 80° C with refined copper scrap as anode and electrolytic copper sheet as cathode. The current efficiency has been reported to be 97.5 per cent and the product contains about 96 per cent Cu_2O and meets with specifications. The energy consumption varies between 0.275 to 0.35 KWH per lb. of cuprous oxide. Improvements have been effected in the electrolytic preparation of calcium gluconate by having a rotating graphite anode revolving at 3,000 rpm. thereby overcoming polarisation and permitting the use of high current density at low voltage (12). A current efficiency of 99.5 per cent, with 10 V, in a rotating anode is obtained as compared to 68.3 per cent, with 11 V in a stationary anode and both with a current density of 17.8 amp./sq. dm. In the electrochemical preparation of chlorates it is found that acidity has to be carefully controlled (13). A high current efficiency of 85-90 per cent has been attained by controlling acidity at *p*H 6.5-7.0.

CONDUCTIVITY DATA

Electrochemical studies have been conducted with a view to elucidate the nature and composition of complex compounds in solution. Conductometric titrations between ferric chloride and potassium ferricyanide in aqueous and aqueous-alcohol mixtures have been carried out to arrive at the composition of Berlin green (15). Discrepancies between the observed and theoretical conductances were explained as being due to hydrolysis. Conductometric, potentiometric and thermometric titrations between cerous nitrate and potassium ferrocyanide support the formation of the complex K Ce $[Fe(CN)_6]$ (16). In studies on the conductivity of As_2S_3 sol during slow coagulation in presence of electrolytes, such as potassium, barium and aluminium chlorides, an increase in conductance during slow coagulation has been observed and explained on the basis of release of counter ions by ion-exchange and surface reaction (17). In the complex formation between thorium and oxalate ions the dissociation constant K has been calculated from a knowledge of the actvity of the complex ion (18). Conductivity measurements on the barium chloride-urea-water system have indicated the formation of four different complexes (19).

POLAROGRAPHY

Some interesting polarographic work has been reported. The quantitative estimation of the γ-isomer of benzene hexachloride by the polarographic method has been studied using dioxane, alcohol and acetone as the organic solvents and lithium chloride and sodium acetate as the base electrolyte (20).

An optimum concentration of 50 per cent dioxane, 0.5 M sodium acetate and 0.1 M lithium chloride in the base solution have been found to be suitable for the estimation of the γ-isomer in the range 0.1 × 10^{-3} to 2 × 10^{-3} M. Higher concentrations of sodium acetate with the use of gelatine as the maximum suppressor extend the applicability of the analytical method over a wide range of concentrations of γ-benzene hexachloride. In a commercial dust preparation the γ-isomer content was found to be 0.84 per cent, using alcohol as the solvent. Using a manual polarograph with a dropping mercury electrode a method has been evolved for the estimation of thorium with fluoride in a solution free from mineral acids (21). The polarographic estimation of small amounts of lead with ferrocyanide within 1 per cent error, has been reported using 0.1 M potassium nitrate as the supporting electrolyte and gelatine as a maximum suppressor (22). In the polarographic study of the acidic silver bromide complex, a formula of $HAgBr_2$ has been obtained for the complex in agreement with Kolthaff and Lingane's theory of reduction of complex ions at the dropping mercury electrode (23).

AC ELECTROLYSIS

The standard potential of Ag-AgCl electrode in spectroscopically pure and dry ethanol gave the value + 0.00977 volt (24) and is different in sign and magnitude to the values reported earlier, which have been ascribed to moisture and impurities. The polyelectrolytic character of the gum agar molecule has been shown from measurements of viscosity at different concentrations and *p*H of agar acid and its sodium salt (25). Electrochemical reactions in alternating fields have been studied with different frequencies ranging from 12.5 to 600 cycles per second with 0.5 M ferric sulphate as electrolyte and platinum as electrodes (26). It has been found that current efficiency is a function of frequency and with boiling electrolytes much higher current efficiencies have been registered than at room temperature. In alternating current electrolysis of sulphuric acid solution, evolution of a gas mixture of hydrogen and oxygen greater than 2:1 takes place below 30 cycles per second (27). Hydrogen peroxide is formed during electrolysis; current efficiency increases with increase in current density and temperature and falls with increase in frequency, duration of electrolysis and concentration of electrolyte.

A theory of strong electrolytes in solution based on new statistics has been proposed and the agreement between the observed and calculated values of activity co-efficients for different concentratons and temperatures is found to be good (28). It has been pointed out how some inconsistencies of the existing theories mainly of Debye and Hückel can be avoided. The electrochemistry of extremely dilute solutions at tracer levels has been interpreted and it is shown that the critical deposition potential would depend on the nature and structure of the electrode, and the heterogeniety of the surface will have an influence on the trend of e/E curves (29). The redox potential of vat dyes and its practical significance has been described (30). In a special issue of 'Electroprocess Industries' (31), the operation and characteristics of Krebs mercury cells, brine purification, electrolytic production of metallic magnesium and recent developments in electroplating are dealt with in detail.

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High-Purity Metals

Production of Vacuum-Melted Alloys

ALTHOUGH the advantages to be derived from the use of vacuum-melted high-quality metals and alloys have been recognised for almost half a century, research in this field was in the first place carried out in laboratory types of equipment and with the only pumps then available. Today, however, there are in the United States a number of firms regularly making and advertising supplies of commercially-produced vacuum-melted metals such as electrolytic iron, iron-nickel-cobalt alloys, copper sheet, ball-bearing alloy steel, and others, the productive capacity of one of these firms being approximately 50 tons of copper and 15 tons of steel per month.

Large Swiss Plant

This stage of development, as will be readily appreciated, has only been made possible by a progressive increase in the sizes of vacuum installations, and a Swiss plant of 440 lb. steel capacity for the commercial production of special steels and alloys has been manufactured by the firm GAB, of Balzers, Liechtenstein. This plant when operated continuously will produce one ton of steel per day.

The plant comprises a water-cooled vacuum chamber, which houses a lip-axis tilting crucible furnace, induction heated. This is so designed as to permit the ready changing of a crucible, or this latter can be formed and fired *in situ*. The commercial production of a variety of alloys necessitates a considerable amount of flexibility in charging the crucible under vacuum, and in this case the necessary flexibility is achieved by means of a special charging funnel, inside which is mounted an interior hopper having six divisions. This hopper can be rotated so as to bring each compartment successively over the discharge outlet, the contents falling into an electrically-operated shaker and into a crucible via a hinged chute at any desired stage in the progress of the melt.

The vacuum chamber is a double-cased water-cooled cylinder in stainless steel, the axis coinciding with the trunnions of the furnace, and is divided vertically into two parts, the shallow fixed portion of which carries the furnace supports, while the outer portion of the chamber can be withdrawn, for which purpose it is mounted on wheels running on rails. The inner surface of the chamber is highly polished so that any deposits or splashed metal resulting from the process can be readily removed. Three inspection windows are provided for observing the progress of the melt and the pour. The maximum length of ingot mould which this chamber will accommodate is 3 ft. 8 in.

In the melting process the removal of large quantities of gas has to be provided for, and the pumping plant is of suitably large capacity, consisting of a couple of two-stage backing pumps in parallel, each with a capacity of some 5,800 cubic feet per hour at atmospheric pressure, and a three-stage oil-diffusion pump with a capacity of some 350 cubic feet per second at 1×10^{-4} mm mercury. This latter is automatically switched on at a fore-vacuum pressure of about 2×10^{-1} Hg, and evacuation of the chamber to a pressure of about 1 micron (0.001 mm) can be effected in 15 minutes from the time of loading a cold charge into a well-dried crucible.

In order that the operator may concentrate upon the actual melting process, the various valves, if not automatically operated, are remote-controlled from the platform, and the switchboard is likewise conveniently close to this.

With an installation of the capacity mentioned, 440 lb. steel can be melted with an end vacuum up to 10^{-3} to 10^{-5} mm Hg in two hours reckoned from the time of closing the vacuum chamber up to the pouring of the ingot. The same general design of plant also lends itself readily to larger capacities up to and including 2,200 lb.

New Indian Council

THE Indian Government has set up a development council for heavy chemicals (alkalis). A development council for heavy chemicals (acids and fertilisers) already exists (see THE CHEMICAL AGE, 1955, **72**, 644).

The new council will recommend targets for production, co-ordinate output programmes and review progress from time to time. It will suggest methods for efficiency, and promote arrangements for better marketing and standardisation of products. It will also suggest ways of improving labour conditions.

Organo-Metallic Compounds

Symposium at Manchester University

A FULL day symposium on organo-metallic compounds, sponsored conjointly by the Chemical Society, the Royal Institute of Chemistry, the Institute of Petroleum and the Society of Chemical Industry, was held at Manchester University on 21 April and attracted an audience of over 400. The symposium was organised by the local section of the Royal Institute of Chemistry. Eight lecturers from various research centres covered a wide range of topics and the animated discussion during and subsequent to the meeting illustrated the intensity of interest stimulated.

A little over 100 years had passed since Professor Frankland, the pioneer of organo-metallic compounds, had worked at Manchester. Professor E. R. H. Jones, as chairman of the morning session, introduced the symposium by saying that, because of Professor Frankland's association with Manchester University, the choice of meeting place for the symposium was particularly apt. Professor G. E. Coates in 'A Review of some Recent Developments in the Chemistry of Organo-Metallic Compounds' demonstrated that the properties of organo-metallic compounds could be attributed to the high tendency of metals to make use of low energy orbitals, manifested by association to polymers or by co-ordination. This was illustrated by reference to metals from groups III, IV and V. Professor Coates also described work which showed the order of donor character of diverse ligands and showed how metal complexes could be utilised to produce free radicals both in solution and in crystalline solids.

Olefine Complexes

Dr. J. Chatt, in a discussion of recent work on 'The Structure of Olefine Complexes with Metal Salts,' demonstrated by spectral and chemical evidence that the few metals which form olefine complexes (Cu^{I}, Pd^{II}, Ag^{I}, Pt^{II} and Hg^{II}) did so by forming an olefine to metal bond by donation of π electrons from the olefine to form a σ-type bond to the metal atom together with a back donation of electrons from the *d* orbital into the anti-bonding π orbitals of the olefine to form a π bond. It was suggested that this type of bonding was probably very common among derivatives of the transition metals and was doubtless responsible for the greater stability of the aryls compared with the alkyls of the transition metals.

Grignard Reagents

Dr. F. G. Mann gave an account of 'New Reaction of Grignard Reagents and their Mechanisms.' It had been known for some time (an early paper by Sir Robert Robinson was referred to) that magnesium behaved anomalously with 2-alkoxy- and 2-aryloxy-ethylhalides, giving an olefine and magnesium alkoxide or aryloxide: $-ROCH_2CH_2X + Mg \rightarrow CH_2{:}CH_2 + Mg(OR)_2 + MgX_2$. A similar reaction occurs with cyclic compounds, e.g. 2-bromo-1-ethoxy tetralin gives 1:2-dihydronaphthalene. Likewise 2-alkoxy vinyl halides gives acetylenes. The action of magnesium on *o*- and *p*-methoxymethyl benzyl chlorides had now been found to give *o*-xylylene and *p*-xylylene respectively and these unstable compounds immediately polymerised. *m*-Methoxy methyl benzyl chloride, however, gave a normal Grignard reagent. This investigation was extended to *o*-methoxy methyl aniline, which with phenyl magnesium bromide gives a small proportion of the polymerised *o*-quinomonomethane-imine and a much higher proportion of *o*-benzyl aniline. p-Methoxy methylaniline behaved similarly whereas the *m*-isomer was recovered unchanged. *p*-Methoxy methyl-N:N-dimethylaniline reacted analogously with phenyl magnesium bromide to give *p*-benzyl-N:N-dimethyl aniline with, however, a small proportion of 2:6-bis-dimethylamino-9:10-dihydroanthracene. The *o*-analogue, being sterically hindered, was unaffected by phenyl magnesium bromide. The interesting mechanism and synthetic application of these reactions stimulated much discussion to which Professor Ziegler and Dr. Baddeley contributed.

The afternoon session, with Mr. Osgood in the chair, was commenced by Dr. M. C. Whiting on 'Organo-Iron Compounds' excluding 'Ferrocene.' Whereas phenyl

acetylene and iron carbonyl interact to give a low yield of a stable substance $(PhC{\equiv}C)_2Fe(CO)_4$ isoelectronic with chromium hexacarbonyl, complexes of a different nature are obtained from acetylenic compounds and iron carbonyl hydride; these compounds are binuclear and suggestions as to their constitutions were made. Dr. E. A. Braude, in describing 'Organic Compounds of Lithium and their use in Synthesis' stated that organo-lithium compounds had advantages over Grignard reagents in their case of preparation, greater reactivity and relative freedom from side reactions. Work leading up to the discovery of 'Ferrocene' and its preparation by two different methods was described by Dr. P. L. Pauson. Variants of the 'Grignard method' yielded many analogues containing other transition metals and a variety of aryl substituted 'Ferrocenes' including bis-indenyl iron. Application of the 'Carbonyl Method' to the chromium group yielded the first mono-*cyclo*-pentadienyl metal derivatives and similar derivatives of vanadium, manganese and cobalt had recently been described. In discussing 'Free Radicals and the Wurtz Reaction' Dr. D. Bryce-Smith said that interaction between alkyl lithium compounds and alkyl halides produced free radicals and, whereas the use of lithium in the Wurtz reaction also produced free radicals, the normal use of sodium involved only limited production of free radicals.

Aluminium Organic Compounds

After tea, Professor Ziegler, who was given a warm welcome by the chairman, Sir Robert Robinson, described 'Progress in the Field of Metalorganic, especially Aluminium Organic Compounds.' He regretted certain omissions which would be rectified at a later lecture as part of the International Congress of Pure and Applied Chemistry at Zurich in July. Research on the pyrolysis of the methyl compounds of aluminium, magnesium and lithium showed the usefulness of diffraction spectra in the elucidation of the structure of the products. Many interesting properties were possessed by new complex compounds of aluminium alkyls with magnesium alkyl of the type $RHg(AlR_4)$ and $Mg(AlR_4)_2$. Of particular use as intermediates for the aluminium alkyl syntheses were the complexes from aluminum alkyls with alkali halogenides, especially the alkali fluorides. Nickel was a very specific catalyst for the so-called 'replacement' reaction between aluminium alkyls and ethylene: $(RCH_2CH_2)_3Al + 3C_2H_4 \rightarrow 3RCH = CH_2 + (C_2H_5)_3Al$ and, by combining this observation with the known 'growing' reaction: $(RCH_2CH_2)_3Al + 3C_2H_4 \rightarrow (RCH_2CH_2CH_2CH_2)_3Al$ in the absence of a catalyst, various possibilities of a 'directed' polymerisation of ethylene were realised. In dealing with the technical application of these reactions, Professor Ziegler stated that, although nickel also catalysed movement of the double bond from the α-position in olefines, this undesirable reaction could be avoided by the use of an acetylene as an anticatalyst. Schematic diagrams of plant illustrated how, by a combination of techniques, it was possible without the use of high pressures to transform ethylene into butene-(1) or into a mixture of higher α-olefines, the peak of distribution of which could be influenced at will.

After a short discussion following a vote of thanks by Sir Robert Robinson, Professor E. R. H. Jones concluded the symposium by thanking Sir Robert Robinson for his full day attendance despite other commitments and expressed the general feeling of gratitude to Dr. R. E. Fairbairn and Dr. H. Gudgeon for their excellent organisation of the symposium.

Aid for Earthquake Victims

AS soon as news of the latest Greek earthquake disasters became known, over £2,000 worth of antibiotic drugs to counter possible outbreaks of disease, were placed at the disposal of Field Marshal Papagos, the Greek Prime Minister.

Officials of the Pfizer company advised that the drugs were already in Piraeus, the port of Athens, and that the shipment was immediately available. Athens representatives of the firm, which has plants at Folkestone and Sandwich in Kent, were instructed to arrange for immediate delivery.

The earthquake occurred in the mountainous Volos area, 150 miles north of Athens where between 40,000 and 50,000 people are homeless and only 10 per cent of all homes and buildings remain intact. After shocks such as this, epidemics from the disruption of water and sanitation systems are frequent.

Less than two years ago a £1,800 consignment of antibiotics was given by the Pfizer company to victims of the Ionian Islands earthquake.

Cab-o-sil

Cabot's Synthetic Colloidal Silica Has Many Uses

SILICA sols are finding increasing application in industry. They are used in non-slip floor waxes, paper coatings and latex rubber dispersions to name only a few. Cab-o-sil, a finely divided silica produced by Godfrey L. Cabot, Inc., 77 Franklin Street, Boston, 10, Massachusetts, can be used for making aqueous dispersions containing up to 30 per cent solid by weight.

Cab-o-sil is a colloidal silica formed by a high-temperature vapour phase flame hydrolysis process which produces an extremely fine product with a particle diameter of about 15 millimicrons. The product differs from silica gels and precipitated silicas and is characterised by high purity, discreetness of particles and large external surface area (about 200 square metres per gram). Aqueous dispersions of Cab-o-sil are very stable and the silica is not precipitated out by changes in *p*H. They are made by adding the solid to the well agitated liquid. For concentrations up to 16 per cent a propeller type of mixer may be used with a speed of about 1,000 rpm. For larger concentrations, up to 30 per cent, agitation should be followed by grinding in a ball mill to give finer dispersion. It is recommended that distilled water be used whenever possible, but tap water may be used if the mineral content is low. About 0.1 per cent of tri-sodium phosphate should be added to the water, the *p*H of which should be adjusted to nine.

Literature Available

A series of leaflets produced by the company describes many of the uses to which Cab-o-sil may be put.

Lighter, brighter colours for car enamels are in increasing demand and for these it is necessary to make use of some transparent extender. The extenders in common use at the moment all have a colour of their own and this colour causes difficulties in matching. The ideal transparent extender should be entirely colourless, capable of forming a stable mill base and have good exterior durability in blends with other pigments. The makers claim that Cab-o-sil possesses these properties.

'White carbon black' has long been the dream of rubber technologists for the manufacture of white and coloured rubber products having the strength and toughness associated with carbon black reinforced rubber. Preliminary work seems to indicate that Cab-o-sil is a suitable material. Some recipes have been published which, it is hoped, will help the experienced rubber compounder to develop his own formulations. Lower loadings of Cab-o-sil than is normal for carbon blacks are necessary to obtain comparable results.

Plastics Applications

Important applications of Cab-o-sil are in the plastics industry. Difficulties arise in the manufacture of polyester-glass reinforced plastics because the resin tends to drain away from the glass substrate with the result that the final product is not uniform in thickness. The addition of Cab-o-sil renders the resin thixotropic, and consequently it can be easily applied by spraying or brushing but takes up a heavy consistency as soon as the application is finished. In this way it is possible to use lower viscosity resins which, it is found wet the glass more readily. Similar remarks apply to vinyl dispersions which are applied by the familiar dip-coating process.

Flatting agents are used in many varnishes to reduce the surface gloss. The materials normally used are finely divided pigments which serve to scatter the light and so reduce the gloss of the film. It has been found that Cab-o-sil has several advantages over the more usual materials. It has important non-settling properties, good stability and there is no loss of flatting by overgrinding. Comparisons are shown of the rate of settling of Cab-o-sil against silica flatting agents.

Formulation of Paints

Similar advantages to those in the enamel industry are shown by Cab-o-sil in the formulation of paints. It is a good transparent extender and emulsion stabiliser.

The makers point out that although Cab-o-sil does not cause silicosis, normal precautions should be taken to avoid inhaling the dust.

Ion-Exchange Work

Some New Developments by DSIR

CONTAINED in 'Chemistry Research 1954' published by the Stationery Office at 3s. is an account of ion-exchange work being carried out by the inorganic and radiochemical groups of DSIR.

A systematic study is being made by the inorganic group of the elution of 'didymium oxide' (Sm_2O_3 6.5, Nd_2O_3 75, Pr_6O_{11} 10.5 per cent) from a cation-exchange resin using ethylenediamine tetracetic acid (enta). 10 gm. of the mixed oxide dissolved in hydrochloric acid are loaded on to a column of Zeocarb 225 resin buffered with ammonium acetate. Elution is by a 0.025M solution of ammonium 'enta' of the same *p*H. Fractions are acidified to *p*H 1.8 when the 'enta' is precipitated, and the rare earths in the filtrate are concentrated as the oxalates. The individual earths are determined by means of a spectrophotometer. Sufficient buffer solution should be added to the eluting liquid to prevent the precipitation of 'enta' on the column. The concentration of rare earth in the eluant decreases with decreasing *p*H, and it has been found that efficient separation can only be obtained when the eluting agent contains an excess of complexing agent. In a typical run, most of the neodymium and some of the praseodymium were isolated in a spectrophotometrically pure state.

Gold Recovery

Work on the recovery of gold and other metals from cyanide solutions has been completed by the radiochemical group. Mixtures of methyl alcohol and hydrochloric acid have been tried as possible eluting agents for aurocyanides. A mixture containing 18 per cent by volume of hydrochloric acid was found to be satisfactory although not quite as efficient as acetone-hydrochloric acid mixtures. A number of experiments indicate that the strong retention of small loadings of gold and silver is related to the degree of cross-linking of the resin.

Investigations are still being carried out with the hope of finding resins which have specific absorption properties for single metals or small groups of metals.

Applications of ion-exchange resins in analytical work are also being studied. A complete separation of copper and nickel using a Zeocarb 225 column has been obtained. The eluting agent employed was acetone containing controlled amounts of water and hydrochloric acid. The nickel remained in the column and could be removed subsequently by elution with ammonium chloride. The separation of cobalt from nickel presented greater difficulties, but good results were finally obtained using the less highly cross-linked cationic resin Amberlite IR-112.

Ion-exchange resins are also useful for the removal of phosphate ions from solutions of heavy metals, and for the removal of the alkali metal in the preparation of the chlorides of the platinum metals.

Synthetic Polyelectrolytes

SYNTHETIC polyelectrolytes have many applications as flocculating agents, and we have already described the uses of Lytron X-886 and RD.4054, made by Monsanto Chemicals Ltd., in sugar clarification (see THE CHEMICAL AGE 1954, **71**, 1296). Some further information in the properties of these substances has now been published.

Lytron X-886 is particularly suitable for use in aqueous systems and functions excellently as a flocculating agent where heavy metal precipitates are present or where heavy metal ions are capable of being absorbed by the suspended matter.

Some recommended applications are:

1. Pigment grinding.
2. Extraction of crude drugs.
3. Sludge removal in fermentation processes.
4. Mineral washing.
5. Tannery lime pits.

Lytron X-886 can also be used to modify the properties of clays.

The method of preparing the ammonium salt of RD.4054 has also been described. Dilute one part of 880 ammonia with 90 parts of water by volume. Suspend five grams of RD.4054 in 75 grams of water and stir to disperse thoroughly. Allow to stand for 1-2 hours and add, with stirring, 20 grams of the dilute ammonia. The resin will slowly swell and dissolve in the ammonia solution. The above solution should have a *p*H of 7.0-8.0, but if a solution of *p*H 7.0 is required it is recommended that only part of the ammonia solution should be added initially, and a small quantity retained to allow for *p*H adjustment.

Indian Newsletter

FROM OUR OWN CORRESPONDENT

A NEW plant for the manufacture of soda ash has been proposed by the Birlas who have registered a company under the name of Saurashtra Chemicals Ltd. The plant will be installed at Porbander in Saurashtra, and will have an intial capacity of 100 tons per day which is expected to be ultimately stepped up to 200 tons per day. The authorised capital of the company is Rs. 50,000,000 (£3,750,000) of which Rs. 10,000,000 (£750,000) will be issued to the public. The Industrial Credit and Investment Corporation, which was formed recently to aid the private interests (THE CHEMICAL AGE, 1954, **70**, 996) is expected to provide Rs. 20,000,000 (£1,500,000) for financing the project. The sponsors also hope to find a part of the finance by buying the plant and the machinery on 'suppliers credit' repayable in seven or eight years. It may be added in this context that an agreement has been signed recently in Washington between the World Bank and India, for a loan of $10,000,000 to the Industrial Credit and Investment Corporation. The World Bank loan is for a period of 15 years.

* * *

Extensions to the caustic soda and chlorine plants have been completed resulting in increased production according to the chairman's statement at the annual meeting of the Alkali and Chemical Corporation of India Ltd., a subsidiary of Imperial Chemical Industries Ltd. There was no difficulty in disposing of the caustic soda output since Indian production is far below her requirements, though more chlorine is being produced than can be absorbed by the market. Among new outlets for the utilisation of chlorine are a hydrochloric acid plant and a benzene hexachloride plant. The demand for the latter product is very good. A small plant for the production of zinc chloride has also been installed.

* * *

A penicillin factory at Pimpri near Poona was commissioned recently. The factory will go into full production by the middle of the year and is expected to meet the present demand of penicillin in the country. The output is estimated to be about 20,000,000 mega-units of penicillin per year. The factory also has plans for the expansion of manufacturing activities, under the Second Five Year Plan, to produce antibiotics such as streptomycin and chloromycin. Some side products from the manufacture of antibiotics would also be taken up. The factory has set up a research laboratory which would conduct fundamental and applied research on problems on penicillin technology and therapy.

* * *

A method proposing the use of pyrogallol as an internal indicator in titrating ferrous iron with dichromatic has been evolved (*1*). It has been found that pyrogallol $C_6H_3(OH)_3$ produces no colour with a pure ferrous salt, but a brownish-red colour with pure ferric salt. Moreover, pyrogallol when present in a solution containing ferrous ions is not oxidised until the whole of the iron is oxidised and a trace of the oxidised product of pyrogallol imparts a red coloration to the solution. These form the basis of the proposed method and a 2 per cent aqueous solution of pyrogallol is used. The end-point in the dichromate titration is the appearance of a pale brownish-red tinge which intensifies into a brownish-red colour with the addition of a drop of the titrant. The titrations have to be conducted in an orthophosphoric acid-sulphuric acid solution. Comparisons of the performance of pyrogallol with diphenylamine and diphenylbendizidine showed a variation of 0.112 to 0.349 per cent Fe in the range 232.5 to 50 mg of iron. The method is reported to be applicable in the presence of hydrochloric acid, gluconate and stannic chloride.

It may also be mentioned here that complex formation between dimethyl glyoxime and ferric salts has been investigated spectrophotometrically and an absorption maximum is obtained at 320 mμ for the ferric dimethylglyoxime complex in ammoniacal medium. The complex obeys Beer's law.

REFERENCE

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Birmingham Jubilee

College of Technology Awards

HONORARY Associateships of the college were conferred on five men at a celebration of the Diamond Jubilee of Birmingham College of Technology on 30 April. Among the recipients was Dr. James C. Duff, D.Sc., F.R.I.C., head of the Department of Chemistry at the college for four years until his retirement in 1954. Associateships of the college were also awarded to a number of students, among them 13 from the Department of Chemistry.

The presentations took place at the Town Hall in Birmingham before a large audience of industrialists connected with the College of Technology, representatives of the city, of the University of Birmingham, and of other technical colleges in the locality.

In his statement before the presentation of the awards, the Principal, Mr. J. Wilson, referred to the dynamic state of technological education at the present time. But he added that 'the extension of knowledge and its application cannot stand alone as the guiding motives for an institution such as ours. It is more likely, I suggest, that a student well qualified academically may be a failure not because he has studied books much but because he has not studied men more.' Thus the development of teaching of personal and human relations aspects of working in industry was having the earnest attention of himself and his colleagues.

Danger of Specialisation

He went on to warn against 'the danger of specialisation by well qualified people in a comparatively narrow field of application of technological knowledge; the tendency is to produce at its worst a perverted vision in which the life of the anthill is mistaken for the world at large. Correctives are wide contacts with fellow students and with people in the industrial environment, and for the student himself to be larger than his speciality such as may emerge through a broad-based course in fundamental sciences and humanistic studies.'

Mr. Wilson spoke of the new branches of technology which lie ahead and which must be catered for in the new buildings at Gosta Green which will shortly be taken over by the College of Technology. While the existing buildings had been planned, not without imagination, in the bicycle and steam carriage age, the new facilities must serve the new industrial age in dealing with the problems of nuclear energy, automation, electronics, plastics, gas turbines, transistors, and many other new branches of applied science at present in the development stage.

Shipping Liquid Sulphur

A NEW method of shipping sulphur as a liquid over long water routes was inaugurated on 4 May when two of three new insulated barges each took on a 2,500-ton cargo of melted sulphur, at a temperature above the boiling point of water, and began an eight-day, 1,100-mile journey up the Mississippi River from Port Sulphur, Louisiana.

The sulphur was loaded at the Freeport Sulphur Company's docks at Port Sulphur, 45 miles south of New Orleans, and will be used in the National Lead Company's titanium division plant at St. Louis.

The three barges, built by the Ingalls Shipbuilding Corporation and operated by Coyle Lines Inc., are insulated with 4-in. foam glass and equipped with boilers and heating coils to maintain a minimum temperature of 260°F, 20° above the melting point of sulphur.

The sulphur is piped into the barges in the same liquid state in which it is mined so that dust loss is prevented, contamination reduced, and the process of re-melting eliminated.

'This new method of shipping sulphur over long distance waterways represents a major advance in the transporting and handling of one of industry's essential raw materials,' says Thomas R. Vaughan, Freeport vice-president.

Freeport began experimenting with the transportation of liquid sulphur in 1948 between its Grande Ecaille mine and Port Sulphur, a distance of 10 miles, with a barge of 600-tons capacity.

Kraft Mills Start in NZ

The Kinleith mills, near Tokoroa, New Zealand—144 miles south of Auckland—belonging to New Zealand Forest Products Limited, recently began the manufacture of kraft pulp and paper. With the new plant in operation, output is expected to reach 45,000 tons of unbleached sulphate pulp and 25,000 tons of kraft paper.

Kittel Plates

New Distillation Technique

THE Kittel plate is a new type of plate for contacting vapour and liquid in distillation, absorption, direct gas cooling, scrubbing and similar processes. It also has uses in continuous counter-current liquid/liquid extractions.

A pressure drop is undergone by any gas or vapour passing through a liquid in a contacting device and in the Kittel plate the energy associated with this pressure drop is used to impart a rotational motion to the liquid on the plate. This motion can be directed in any desired direction by suitable orientation of the apertures in the grids forming the Kittel plate. In the standard type of plate, consisting of two grids, the arrangement of the apertures is such that the liquid on the upper grid is given a centrifugal motion while that on the lower is given a centripetal motion. This produces a stable flow across the grids and provides exceedingly good liquid distribution throughout the column.

Properties & Uses

An account of the properties and uses of these plates is contained in a brochure produced by the manufacturers, Costain-John Brown Ltd., 73 South Audley Street, London W.1, manufacturers of chemical engineering equipment. They claim that the rotational flow on the Kittel plate achieves the following results:

1. Intensive exchange between vapour and liquid.
2. Any sedimentation of suspended solids is effectively prevented.
3. The intensive mixing of the liquids prevents the formation of inactive zones.
4. The upper grids automatically act as cyclone separators and effectively reduce entrainment of liquid so that the distance between plates can be kept low.

Comparisons have been made between the Kittel plate and a well designed bubble cap plate. The bubble cap plate shows good efficiency at low loadings compared with the Kittel plate. This apparent disadvantage is offset by the very much reduced pressure drop across the Kittel plate. For a pressure drop of 30 mm. the load taken by a bubble cap plate is only one third of that permissible for a Kittel plate. A tower equipped with Kittel plates will always have considerably smaller dimensions for a given loading than conventional towers.

To simplify construction each grid is subdivided into six main sectors. No matter what the size of the column the grids can be made up from standard sections in the form of equilateral triangles. The whole assembly is put together without the use of screw fittings which would cause difficulty in removal after service.

Kittel plate installations are at present in use for distillations under atmospheric pressure, elevated pressure and vacuum, absorption of gases, such as CO_2, H_2S, NH_3, degasification, gas cooling and liquid/liquid extraction.

Revised British Standard

THE British Standards Institution announces the publication of a revised edition of BS 1524 : 1955 (cellulose acetate moulding material).

The 1949 edition classified the material in accordance with the softening point, but this method of classification has now been discontinued in favour of the flow temperature, which has been found more convenient. Additionally, the temperature and humidity of the atmosphere used for conditioning have been changed to 23° and 50 per cent relative humidity respectively.

The former edition was based on statistical principles, but due to the new method of classification and the additional tests, which have been included, it has not been found possible to lay down statistical limits in this edition, particularly as insufficient background data are at present available.

The document provides for five types of material which are classified by their flow temperatures. Limits and methods of test have been provided for the following properties: fines and impurities; moisture content; impact strength; tensile strength; deflection under load; viscosity change on moulding; moisture absorption; loss in weight by leaching; loss in weight by heating; rate of burning; liability to bleeding of colour; removal of colour by rubbing; electric strength; heat stability of colour; colour fastness to light; and softening point.

The clause referring to marking is accompanied by a note referring to BSI Certification marks. Copies of this Standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1. Price 6s.

Fish Meal Oil

New Method of Determination

THE Fishing Industry Research Institute, Portswood Road, Cape Town, in Bulletin No. 23, refers to research in regard to fish meal, and on the rapid determination of oil in fish meal and states that the normal procedure for determining the oil content of a substance such as fish meal is to extract the oil in a Soxhlet apparatus, using a solvent such as ether or hexane. This method involves the weighing of the meal sample, of the clean flask and finally of the flask and extracted oil. To obtain the accuracy generally required at the Institute, extraction of the oil requires at least four hours in the apparatus used; and the evaporation of the solvent from the oil and heating the latter to constant weight, requires a further 1½ to 2 hours. Determination of the oil content of fish meal by the method recently investigated requires less than 20 minutes.

The method is based on the decrease of refractive index of monochlornaphthalene when fish oil is dissolved in it. Five grams of the meal (weighed to the nearest 10 milligrams) is weighed with 5 ml. of the solvent. The mixture is heated in a sealed container for ten minutes and cooled. A few drops of the liquid are then squeezed through a filter paper on to the refractometer prism and the refractive index read to the nearest 0.0001. After applying corrections for the solvent and temperature if necessary, the oil content of the meal is obtained directly on a percentage basis, by means of tables prepared at the Institute.

Method Standardised

The method was standardised against the Soxhlet method, using 35 different fish meal samples with oil contents ranging between 4 per cent and 18 per cent. The graph obtained by plotting Soxhlet values against refractive indices appeared to be a straight line and the maximum deviation over the entire range was 0.6 per cent. It was 0.5 per cent over the range 4 per cent to 12 per cent.

Monochlornaphthalene is procurable at present at about 42s. 6d. per lb., and this is equivalent to about 7d. per determination. The additional equipment required would be the inexpensive cylindrical containers and a refractometer costing about £100. The latter instrument may, however, also be used for several other purposes at the factory, such as measuring the concentration of soluble solids in tomato pastes and purees, the total solids of stickwater concentrate, and the concentration of sodium hexametaphosphate solutions. Interested members of the Institute are being supplied with a detailed description of the new rapid method for determining the oil content of fish meal.

Flash Smelting Process

THE International Nickel Company of Canada, Limited, has revealed details of its oxygen flash smelting process for treating copper concentrates. One of the world's first commercially successful processes for smelting fine sulphides in suspension, the method developed by Inco is now being used to treat all of its copper sulphide concentrates.

Under development since 1945, the process recently completed its first full year of successful operation. It has reduced Inco's copper smelting costs and, in addition, the use of oxygen for smelting has resulted in the production of a high quality furnace gas from which liquid sulphur dioxide and sulphuric acid are made. The low-cost oxygen which makes Inco's process economically possible is produced by a tonnage oxygen unit known as an Oxyton, which was built for Inco by Canadian Liquid Air Co.

In the Inco flash melting process, finely divided copper concentrates and flux are dried and injected with oxygen into the preheated smelting furnace to produce matte, slag, and a gas containing about 75 per cent sulphur dioxide. In the furnace, the oxygen combines with some of the sulphur and iron of the chalcopyrite (copper-iron-sulphide) to form sulphur dioxide and iron oxide. The heat of the reaction is sufficient to melt the residual copper-iron sulphide to form a matte, and the iron oxide combines with the siliceous flux to form a slag. An important feature of the Inco process is a novel method of cleaning the copper-rich slag by flash smelting pyrrhotite at the skimming end of the furnace. The slag is showered with iron sulphide droplets which, in settling into the matte beneath, extract copper from the slag.

The flash smelting furnace gas is water-scrubbed and treated by a wet Cottrell before it is converted into liquid sulphur dioxide by Canadian Industries (1954) Limited.

CHEMISTRY & BIOLOGY OF THE PTERIDINES. Ciba Foundation Symposium. J. & A. Churchill Ltd., London. 1954. Pp. 425. 42s.

The symposium, organised by the Ciba Foundation and given a permanent record by the publication of this book, was held in London in March 1954. The importance of the role of the pteridines in living processes has been gradually emerging from research in recent years, but as Dr. Jacobson says in his concluding remarks as chairman 'the development of ideas in this field began with fortuitous and disconnected events.' These events lay as far apart as Gowland Hopkins' early work on butterfly pigments to an observation that the prevalence of anaemia in Bombay had a particular nutritional basis. Since the pteridines have so many associations, it is fortunate that the Ciba Foundation decided to help on the development of ideas by gathering together a wide range of experts for this symposium.

This is a specialists' book. However, it contains material which will interest organic chemists, microbioligsts, embryologists, biochemists, pharmacologists and clinicians. Part I, containing sixteen papers, deals with the chemistry of the pteridines and should be a useful source of reference and technical information for anyone working with these compounds; in particular, their ultraviolet spectra is discussed in some detail. Investigations on the pteridines of the silkworm and the fruit fly (*Drosophila melangaster*) are also described.

In Part II, the papers on the biological aspects are largely concerned with the theme of metabolite and anti-metabolite, as originally demonstrated in the antagonism of the normal bacterial metabolite, *p*-aminobenzoic acid, to the bacteriostatic action of the sulphonamides. The contributors discuss and review work on the metabolic steps, which link *p*-aminobenzoic acid to folic acid and the associated pteridines, and on the synthetic processes catalysed by the co-enzymes formed from this vitamin group. Most are working with bacterial strains, but three of the contributors deal with the action of aminopterin and other anti-folics, on the protozoan *Tetrahymena*, on tissue cultures and on the embryonic development of the chick. For readers with medical interests, there is scattered among the papers useful information on the development of resistance of both bacterial and malignant cells to folic acid antagonists and related anti-metabolites, and a helpful but short review of the causes and consequences of disordered folic acid metabolism in man.—I. LESLIE.

'MODERN ASPECTS OF *p*H.' By James Small. Baillièu. Tindall & Cox, London. 1954. Pp. 247. 20s.

This book is the successor to Professor Small's text '*p*H and Plants' which appeared in 1946. The earlier work gained a mixed reception and this latest production, although remodelled to some extent, is largely a re-hash. True, the author has endeavoured to fashion the subject in the technical garb prescribed by British Standard No. 1647 but even so, most chemists are likely to find the treatment of the fundamentals of the subject in the first two chapters not very satisfactory. Perhaps it is only fair to state that the author emphasises in his preface that he writes as a botanist and much of the book is concerned with the *p*H values and buffer capacities of living plant tissues and of the soils in which plants grow.

Chapter 3 is concerned with buffer systems more particularly in relation to plant tissues and Chapter 4 with buffer index values. It is in the use of buffer index values that Professor Small's most notable personal contribution lies. After this section comes a chapter on *p*H in relation to cell sap with an interesting account of the indicator properties of the natural colouring compounds in flowers; then a chapter dealing with the effects of carbon dioxide on the *p*H of plant tissues and soils, and next, a chapter of mixed content entitled, 'base avidities of surfaces and non-aqueous media'

in which the author has touched on the theoretical and practical difficulties of *p*H measurements with electrodes in colloidal suspensions.

Chapters 8 to 11 cover what may be termed the field section of the book under the titles of environmental *p*H relations, buffer capacity of soil, soil *p*H values in ecology, and soil *p*H values in agriculture. Here the soil scientist with a chemical training will immediately detect shortcomings in the author's understanding of the mineral and organic components of the soil system.

Then follow two chapters dealing respectively with plant hormones and enzymes in relation to *p*H, a brief chapter on some peculiar features of succulent plants, and finally a section on *p*H in industry. This last chapter is a collection of brief notes designed to show the importance of *p*H control in a wide variety of industrial processes ranging from water purification to metal plating together with some features of *p*H in relation to the food industries, particularly the gelling of pectin in jam making.

This book brings together much scattered information and as such is a useful compilation but it is a pity the modern aspects suggested by the title are not better portrayed in the text. The author's laboured style of writing and frequent recourse to self justification does not make for easy reading.—J. TINSLEY.

INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS. By G. W. Ewing. McGraw-Hill Book Co., New York & London. 1954. Pp. x + 434. 52s.

This book provides a thorough introduction to an even wider field than that suggested by the title, since such topics as the determination of water, gas analysis, ion exchange and extraction analysis, not strictly speaking instrumental methods, are also included. However, the author has wisely not allowed himself to be too strictly limited in his scope simply because no very satisfactory single term has so far been devised to form a blanket covering for all the methods which he wishes to introduce.

The book is primarily for teachers and students but it should prove of wider interest and use. The basic theory of the methods is described clearly, and without permitting so much elaboration that the book becomes too advanced for the reader at which it is aimed, thus ceasing to be an introduction. At the end of each chapter a series of theoretical exercises is designed to drive home the essential points of the theory. At the end of the book a comprehensive practical course is described which includes detailed directions for experiments illustrating most of the methods discussed in the theoretical section.

There is a brief but admirable chapter on 'General Considerations in Analysis' which is a valuable introduction to the factors which may influence choice of method. This is an aspect of instrumental analysis all too often inadequately considered.

This book is one of the best dealing with these topics at advanced student level that the reviewer has met. It can be strongly recommended. It is, unfortunately, merely another of the mysteries of international finance that the American price of $6.50 becomes transmuted, in transit across the Atlantic, to 52s.—CECIL L. WILSON.

Choice of Three Plants

PLANS for the construction of one of the largest sulphuric acid plants in Canada are now nearing completion, it is reported. The entire plant production of 110,000 to 150,000 tons of acid annually will go to processing the uranium ores from Canada's developing Blind River camp in Northern Ontario. The plant, to cost anywhere from $2,500,000 to $50,000,000, will be located either in Blind River or at Copper Cliff, Ontario.

For plant completion and first acid production by mid-1956 definite construction plans have to be decided on soon. Algom Uranium Mines, with advanced plans for three separate mining plants on its extensive Blind River holdings and an initial ore tonnage of around 7,500 tons daily, is having to decide which one of three different acid projects to accept.

First, there is a plan whereby Canadian Industries (1954) Limited, would build a new plant at Copper Cliff, Ontario, some 85 miles away. Basic raw materials there would be sulphur fumes from the International Nickel Company's smelter smokestacks. Second, there is Noranda Mines Co., Ltd., which has come up with a plan to build an acid plant right at the Algom camp. This would recover acid from pyrites.

Finally, Algom Uranium Mines could build its own acid plant at Blind River, using elemental sulphur brought in by boat from the United States via the Mississippi.

• HOME •

Imports of Bentonite Clay

The Board of Trade announce that bentonite can be imported from all countries without individual import licences from 13 May. Imports from dollar sources have hitherto been subject to licensing control.

Zinc Associations Move to London

The Zinc Development Association and its affiliates, the Hot Dip Galvanizers, the Zinc Alloy Die Casters and the Zinc Pigment Development Associations, have moved from their premises in Oxford to 34 Berkeley Square, London W.1 (Tel.: GROsvenor 6636). Among the features of the new building will be a permanent exhibition of zinc and zinc products.

Works Holidays

The factories of George Kent Ltd. at Luton and London will be closed for the annual works holiday from Friday evening, 15 July, to Tuesday morning, 2 August. The Kent factory at Resolven, South Wales, will be closed from 23 July to 7 August inclusive. Offices at all factories will remain open and staffed during the holidays.

BRRA Laboratories Opened

The new research laboratories of the British Rayon Research Association at Heald Green, Wythenshawe, Manchester, were opened by the Duke of Edinburgh on 11 May. The laboratories cover a total floor area of 16,000 sq. ft. and comprise physics, chemistry, physical chemistry, electronics and technological laboratories. The laboratory furnishings were manufactured and installed by Baird & Tatlock (London) Ltd. A fuller report will appear in our issue next week.

Pentachlorophenol Formulations

Monsanto Chemicals Limited announce that from 1 June they will cease to manufacture and supply Permasan No. 1 and Permasan No. 2 pentachlorophenol formulations and, reverting to their customary role as manufacturers and suppliers of raw materials, will confine their activities in this field to the production of pentachlorophenol. Pentachlorophenol formulations virtually identical with Permasan Nos. 1 and 2 are now available from a number of firms.

Summer Closing

Howards of Ilford announce that their works will be closed from Monday, 18 July, to Monday, 1 August, inclusive.

Record Output of Man-Made Fibres

British output of man-made fibres in March set a monthly record, at 42,200,000 lb. The previous highest monthly total was in March last year (40,200,000 lb.). Since the beginning of this year Terylene and Ardil have been included in the figures which partly accounts for the increase. Output in January and February was 38,200,000 lb. and 37,100,000 lb. respectively.

Robot Factories : Britain Lags

Sir Harold Hartley, past president of the Institution of Chemical Engineers, gave the first Graham Clark lecture to a joint meeting of the Institution of Civil Engineers, the Institution of Mechanical Engineers and the Institution of Electrical Engineers on 4 May. He stressed the urgent need for Britain to realise the importance of the development of automatic control devices and robot factories. The US and Russia, he said, had made far more progress.

Seaweed Factory Delay

Inverness-shire Planning Committee is to protest at delay by the Development Commissioners in deciding on the location of a factory at Lochmaddy, North Uist, for processing seaweed. The Committee asked the county some time ago to build a factory at a cost of £18,000 to be leased to Alginate Industries Ltd., who already have other factories in the area. The county in turn asked the Development Commissioners to consider the application, and although this took place months ago no decision has been reached.

Fluorine in the Lollies

The possibility of an experiment with fluoridation of chocolate and ice lollies is being considered by the county of Stirling. A sub-committee of the School Joint Health Committee has asked the County Medical Officer to undertake an experiment in which sweets containing a small proportion of fluorine will be made available on a voluntary basis to school children.

OVERSEAS

Exposition of Chemical Industries

Announcement has been made that the 25th Exposition of Chemical Industries will be held at the Commercial Museum and Convention Hall, Philadelphia, 5 to 9 December, under the management of the International Exposition Company, 480 Lexington Avenue, New York 17, NY, E. K. Stevens, manager. As before, the exposition will cover the many aspects of chemistry and chemical engineering that are applied throughout the industrial world.

All Kwinana Units Commissioned

BP's first hydrofiner recently came into operation at the new 3,000,000 tons a year Kwinana Refinery, Western Australia. All units at the refinery are now commissioned. The hydrofiner, which removes sulphur from gas oil, was developed at BP's research station at Sunbury-on-Thames. At present it is the only one in the BP Group, but similar units are to be built at the Kent and Hamburg refineries.

Duty-Free Metal Imports in US

The US House Ways and Means Committee has approved a bill to continue the duty-free importation of copper into the country for another three years. The committee has also approved a bill to continue for another year the duty-free importation of all metal scrap except lead and zinc scrap.

NZ Explosives Centre Re-opened

A small field testing station has been re-established at Shelley Bay, Wellington, NZ, to conduct tests on imported explosives. The station, closed during the war, is at present limited in its operations, but when fully staffed will carry out all tests required by New Zealand regulations. Except for small-arms ammunition and fireworks, New Zealand imports all her explosives.

Imperial Oil Plan New Plant

A new petroleum wax has been developed by Imperial Oil and will be produced in commercial quantities at a new plant to be built in Ontario. Dr. J. L. Huggett, superintendent of Imperial Oil's Sarnia refinery said the wax was extremely pliable, had a high gloss and a low melting point. Construction will begin in the autumn and it will be completed by January 1957.

Plastics Factory Explosion

Twelve people were killed and 18 burned in an explosion at a plastics factory in Mexico City on 4 May. About 2,500 gal. of burning liquid was showered over a passing bus.

Croda in Italy

A company known as Croda Italiana has been formed in Italy by Croda Ltd. and Gaetano Marzotto and Figli, an Italian wool textile firm. A plant is being built at Mortara, Pavia, adjacent to the wool grease plant of the Marzotto mill and is expected to be in operation by 1 July. It will process the wool grease into lanolin and lanolin derivatives.

North Pole Soil For Research

When the American Polar Basin Expedition to the North Pole returns to New York early next month it will bring soil dredged from the floor of the polar sea for analysis by Pfizer Ltd., producers of antibiotic drugs. This will be the first time that soil from the North Pole sea bottom has been analysed, and Pfizer's consider the research worth making, for it was only after 100,000 samples of soil had been studied that terramycin was discovered.

Platinum Metals Sales Up

Preliminary figures indicate that total sales of platinum-group metals to domestic consumers in the US were 10 per cent greater in 1954 than in the preceding year, according to the US Bureau of Mines. Sales of platinum increased 18 per cent, sales of palladium were virtually the same and sales of iridium, osmium, rhodium and ruthenium together increased 10 per cent. Total imports of platinum-group metals were 5 per cent less in 1954 than in 1953.

US Synthetic Rubber

A synthetic rubber known as 'Adiprene' burethane rubber is claimed by its makers, Du Pont de Nemours & Co. of the US to have outstanding toughness and resistance to abrasion. It is also said to avoid brittleness at temperatures as low as −90° F. and to resist the deteriorating effects of oils, oxygen, ozone and weathering. The rubber is still in the field testing stages, and several processing difficulties have to be overcome before it appears on the market.

· PERSONAL ·

MR. WILLIAM BOASTEAD, F.R.I.C., and MISS JOAN WILSON, B.Sc., A.R.I.C., both members of the laboratories staff of the Liverpool city analyst, were married on 2 May at Heswall Parish Church.

Rhodes, Brydon & Youatt Ltd., engineers, announce that they have appointed MR. M. A. GRAHAM as their technical representative in Northern Ireland. His address is 10 Brunswick Street, Belfast; telephone Belfast 29087.

As from 1 April MR. L. EDGAR has been appointed group publicity manager of John Thompson Ltd., Wolverhampton. He will be in charge of all press relations and publicity/advertising matters concerned with the John Thompson group of companies, which includes, among others, Herculoid Ltd., and Metronics Instruments Co. Ltd.

Sheppy Glue & Chemical Works Ltd., Horley, Surrey, announce that following the recent death of the chairman, MR. FRANCIS HUGH STEVENS, the board have elected his son, MR. FRANK MAURICE STEVENS to succeed him. Mr. Stevens has served 34 years with the company and has been a member of the board since 1929. He is vice-chairman of the Federation of Gelatine and Glue Manufacturers.

MR. H. A. COLLINSON, F.R.I.C., A.P.I., technical director of Leicester Lovell & Co. Ltd., has been appointed chairman of the main technical committee of the British Plastics Federation.

MR. LASCELLES MORTON WOOD, managing director of Norman Wood & Son Ltd., slubbing dyers, Crown Dye Works, Birkshall Lane, Bradford, has been elected honorary secretary of the Society of Dyers and Colourists, whose headquarters are in Bradford, in succession to MR. JOHN G. HOPKINSON, director of Hopkinson & Shore Ltd., cloth dyers and finishers, Brighouse, who has retired from the honorary secretaryship for business reasons. The firm of Norman Wood & Son Ltd., was founded at Halifax some 75 years ago as Jagger & Binns and was transferred to Bradford about the beginning of the century. Mr. Wood, only son of the late Mr. Norman Wood, whose name the company now bears, has taken a keen interest also in the work of the Dyers and Finishers' Association, of which he is now vice-president. He was educated at Leys School, Cambridge, and at Bradford Technical College.

MR. B. S. HSU, B.Sc. (Tech.), of Chorltonville, Manchester, at present engaged on research on the relaxation of tensile stress in synthetic fibres under different constant strains and at various humidities and temperatures, at the College of Technology, Manchester, has been awarded a Textile Institute Research Studentship. Mr. Hsu, who joined the Institute in 1951 when he came to the United Kingdom, was born in Shanghai. On reaching this country, he took a full time degree course in textile technology at the College of Technology in Manchester, graduating with first-class honours last year.

DR. AUGUSTUS B. KINZEL has been elected 'Vice-president-Research' of Union Carbide and Carbon Corporation, succeeding DR. GEORGE O. CURME, Jr. Dr. Curme, who is retiring as vice-president of the corporation, will continue as a director. Dr. Kenzel has been actively engaged in research work with Union Carbide and Carbon Corporation since 1926, when he joined Electro Metallurgical Company as a research metallurgist. He became chief metallurgist of the laboratories in 1931, and a vice-president of Electro Metallurgical Company in 1944. He was appointed director of research of Union Carbide and Carbon Corporation in July, 1954.

DR. WILLIAM E. BUNNEY has been named director of manufacturing operations of the E. R. Squibb & Sons Division, Olin Mathieson Chemical Corporation. He succeeds MR. CARL E. ANDERSON, who has resigned to take an important executive post in another company. A member of the Squibb organisation since 1938, Dr. Bunney has held successively the posts of director of biological products production, director of the biological laboratories, director of the manufacturing laboratories, and director of overseas manufacturing. He is a member of the

American Association of Immunologists, American Association for the Advancement of Science, American Chemical Society, American Public Health Association, Society for Experimental Biology and Medicine, Society of American Bacteriologists, and the Chemists' Club of New York. He is a fellow of the NY Academy of Sciences and the NY Academy of Medicine.

Obituary

MR. LEWIS JOHN ERIC HOOPER, chairman of Doulton & Co. Ltd., died in London on 8 May at the age of 76. The great-grandson of John Doulton, founder of the pottery 140 years ago, Mr. Hooper joined the staff of the Royal Doulton pottery in 1902. He was appointed a director in 1909, managing director in 1919, and chairman in 1925.

Born at Little Langley, near Guildford, Surrey, Mr. Hooper was educated at Marlborough and Magdalen College, Oxford, where he took an honours degree in law. He was a tireless worker and under his chairmanship Doulton's built new factories at Stoke-on-Trent, Erith and Tamworth. He was chairman of the London Potters' Association and of the National Federation of General Stoneware Manufacturers, as well as vice-president of the Federation of British Industries.

MR. R. T. PRIESTMAN, managing director of T. J. Priestman, Leopold Street, Birmingham, died on 2 May after a short illness.

Will

MAJOR VIVIAN FORD GLOAG, M.C., M.I.Chem.E., of Palace Court, Bayswater, London, formerly of Holmwood, Knutsford, London director of Simon-Carves Ltd., former president of the Institution of Chemical Engineers, and past chairman of the British Chemical Plant Manufacturers' Association, left £16,415 (duty £1,103).

Lustrex Latices

INFORMATION concerning the properties and uses of Lustrex Latices is contained in technical service bulletin Q1/1 published by Monsanto Chemicals Ltd. These latices are available in both unplasticised and plasticised forms. The former must be heated to 350/380° F to produce a continuous film, whereas the latter will do so on drying at room temperature. The unplasticised latex is, however, recommended for general use as it is simple to plasticise and it is possible to vary the quantity of plasticiser, protective colloid and emulsifying agent to suit individual circumstances.

A short review is given of some suggested uses for Lustrex latices. Emulsion paints based on these latices are claimed to possess good resistance to chemicals and to water, good adhesion, good can stability and good colour retention. No difficulties arise in manufacture and a typical procedure is outlined using the unplasticised latex 45A with Lustrex X.820 as protective colloid.

Lustrex X.820 and the dispersing agent are stirred with water and ammonia is added. The stirring is continued until a clear solution is obtained. The pigments, fillers and plasticiser are then added and the mixture is stirred until a smooth paste is obtained. This paste is then milled on a triple roll mill or an edge runner. The milled paste is transferred to mixing equipment and Lustrex latex 45A is added and the mixture stirred for at least 30 minutes. A very wide range of pigments and fillers is compatible with Lustrex latices but those with soluble polyvalent metal ions should be avoided as they would tend to coagulate the latex.

Lustrex latices can also be used in paper coatings, leather finishes and as a coating for glass fibres in the manufacture of injection moulding compounds.

Exemptions from KID

THE Treasury have made an Order under Section 10(5) of the Finance Act, 1926, exempting the following articles from Key Industry Duty, for the period beginning 9 May, 1955, and ending 18 August, 1955:—ephedrine hydrochloride (an ephedrine salt) of a purity not exceeding 95 per cent, and ethyl 4:4′-dichlorobenzilate (an ethyl ester).

This Order is the Safeguarding of Industries (Exemption) (No. 3) Order, 1955, and is published as Statutory Instruments 1955, No. 663. Copies of the Order may be obtained (price 2d., by post 3½d.) from HM Stationery Office, Kingsway, London W.C.2, and branches, or through any bookseller.

Publications & Announcements

THE story of Bowmans Chemicals Ltd., of Widnes, Lancashire, from 1905 to 1955 is told in a booklet, 'Progress in Chemicals', brought out to celebrate the firm's golden jubilee. It was on 7 April 1905 that the concern of a Glasgow chemist, Robert Bowman, who had set up business in Lythgoes Lane, Warrington, to provide chemicals for the brewing trade, was incorporated as Bowmans (Warrington) Ltd. Ten years later the firm was moved to Moss Bank, Widnes, and work was begun on the production of lactic acid. This is today Bowman's chief product and is used in a number of different fields. The firm also produces lactates, principally calcium lactate, sulphonated oils and certain chemicals mainly used in tanning. In the past few years it has undertaken a policy of re-equipment and 'is capable of re-directing its production whenever opportunity presents itself'.

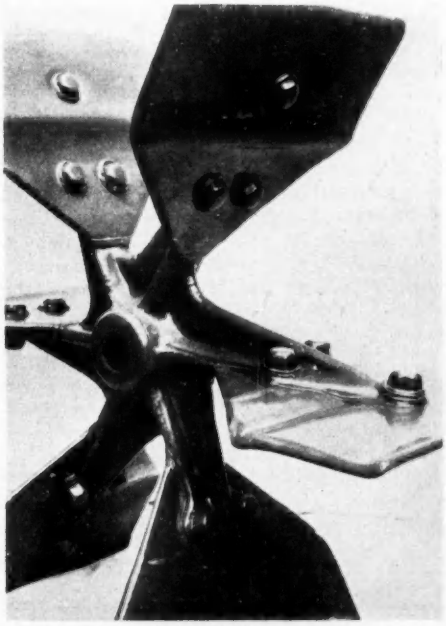
* * *

J. W. TOWERS & Co. Ltd., of Victoria House, Widnes, Lancs, are celebrating the 100th anniversary of the birth of their founder. This information is contained in *Towers Laboratory News* No. 11 which also introduces two important additions to their range of laboratory equipment. An automatic distillation apparatus has been designed in collaboration with the Shell Refining & Marketing Company. The sample is heated in a distillation flask connected to a condenser of standard dimensions, at the lower end of which is a receiver. A thermocouple is incorporated in the neck of the flask. As soon as the first drop of distillate leaves the condenser it passes a photo-cell which is used to operate a pen which marks the initial boiling point. A second photo-cell records the quantity of liquid in the receiver and a curve is obtained of volume against temperature. The apparatus switches itself off automatically. The technique of counter-current distribution between two liquid phases is a valuable aid in synthetic and analytical chemistry. Towers produce both semi-automatic and automatic counter-current apparatus which should be of use to university and research laboratories.

SUNVIC Controls Ltd., 10 Essex Street, London W.C.2, announce the manufacture of a Pulse Height Analyser, a new addition to their range of scientific and industrial products. This instrument is for the analysis of a complex pulse amplitude spectrum into groups of known height. It is of the type described by Hutchinson and Scarrott (*Phil. Mag.*, 1951, **42**, 792).

* * *

RECENT additions to the Turbro range of chemical plant supplied by Turner & Brown Ltd., are Turbro Polythene cowls and metal paddle blade impellers completely sealed in rigid polyvinyl chloride. The cowls can be manufactured to any size in polythene or rigid PVC. They will withstand chemical attack and, in view of their resistance to corrosion, do not require painting. One such cowl is a 24 in. i.d. Turbro cowl constructed from ¼ in. polythene sheet and reinforced with mild steel supports encased in polythene. Impellers sealed in rigid PVC have been examined after 12 months continual use and found to be in perfect condition.



A Turbo paddle blade impeller coated with rigid PVC

LATEST edition of *Technique* published by Muirhead and Co. Ltd., Beckenham, Kent, includes articles on a new standard Weston cell, AC servomotors and servo amplifiers, and an apparatus for the measurement of dynamic mechanical properties of plastics materials. The new Weston cell is claimed to combine robustness and small size with high capacity.

* * *

WINSTON Electronics Ltd., of Hampton Hill, Middlesex, have developed the Decade Resistance Box in which three switches enable any ohmic value between 10 and 111 kilohms to be set in 10's. The switching action is very definite and the resistance is obtained to within a tolerance of one per cent. The box is made of hammer-grey enamelled steel which is corrosion proof and will stand up to arduous field conditions.

* * *

CONTAINED in the latest edition of *Endeavour* (Vol. 14, No. 54) is a short account by Sir John Cockcroft and T. G. Pickavance of the various types of high-energy particle accelerators. Some of the problems encountered in the design and manufacture of these machines are described and the principles of some of the more important ones are briefly explained. Contrary to the normal view, the linear accelerator is by no means obsolete and has definite advantages over closed orbit accelerators for the production of electron beams. Economic considerations play a very large part in determining the types of accelerator which can be used for the highest energies. Some interesting photographs are included of the more important accelerators in Britain and the US. Also in this volume are 'Chemical Aspects of the Atomic Industry' by E. Glueckauf and 'Determination of the Absolute Configuration of Optical Antipodes' by J. M. Bijvoet.

* * *

ADSORPTION by activated alumina is the principle of the Birlec Lectrodryer made by Birlec Ltd., Birmingham 24. Two adsorption beds are incorporated, one of which is engaged in drying while the other is being reactivated. Automatic change-over is a feature of design frequently employed. The drying agent releases its moisture when heated, without deterioration of its drying properties. Reactivation heaters are embedded in the adsorbent material, giving high thermal efficiency. These installations have many applications in chemical industry.

THE 'Interjet' oxygen cutting nozzle has been designed by BBM Ltd., Fossgate, York. These nozzles may be adapted to any fuel gas and to cut any thickness of steel merely by fitting the appropriate jet. Wear in the torch head is compensated for automatically by special features in the design. All 'Interjet parts are completely interchangeable and damaged components can be replaced independently.

* * *

'CHEMISTRY, Biochemistry and Isotopic Tracer Technique' is the title of a lecture given by G. Popjak of the Experimental Radiopathology Research Unit, Hammersmith Hospital, to the Leeds area section of the Royal Institute of Chemistry on 15 March and now published by the Institute. With the advent and perfection of isotopic tracer technique, organic chemistry has come to play an increasing part in biochemistry. The biochemist must also be a good organic chemist or have the help of willing and interested organic chemists. The use of isotopically labelled substances has furnished the first clues as to the possible precursors or intermediates involved in reactions in the living cell.

* * *

APPLICATION of electronic capacity relays to industrial level indication is the subject of a booklet 'Level Control' produced by Fielden Electronics Ltd., Paston Road, Wythenshawe, Manchester. The *Tector J* Level Indicator provides visual indication and control of the height of solids or liquids in hoppers, bins and similar containers. An electrode is inserted into the side of the container and as the level of the material inside rises or falls a change of capacity occurs which operates a simple electronic circuit which in turn operates a relay. This relay can be used to provide both high and low level warning and control. The instrument will work equally well on solids, liquids and viscous substances. There are no moving parts in the detector, which makes for easy installation and maintenance. Examples are given of the use of this device in many different types of industry, including automatic bin discharge, level indication of boiler flue dust, interface detection where two immiscible liquids are concerned and froth detection in brewing and in antibiotics manufacture. If the material under control is appreciably conducting some form of insulation is necessary; otherwise a bare electrode may be used.

Law & Company News

New Registrations

Ducksback Ltd.

Private company. (548,642.) Capital £100. Manufacturers of and dealers in varnishes, enamels and paints of all kinds, etc. Directors: Rodney W. Smyth and Malcolm J. Briggs. Reg. office: 39 High Street, Falmouth, Cornwall.

Sorex (Dublin) Ltd.

Private company. (15,614.) Registered in Dublin. Capital £500. To carry on the business of manufacturing, compounding, mixing, packing, marketing and selling vermicides, rodenticides, insecticides and other pest control products, etc. The subscribers (each with one share) are: John H. Moore and John A. Milliken. The first directors are not named.

R. G. McLeod Tools Ltd.

Private company. (548,578.) Capital £20,000. Manufacturers, importers and exporters of and dealers in all kinds of materials, metals, chemical mixtures and compounds, machinery, machine and other tools, etc. Subscribers (each with one share) are: Roderick G. McLeod and Louis Gabe. The first directors are not named.

Pharmethicals (London) Ltd.

Private company. (548,427.) Capital £5,000. Industrial and manufacturing chemists, etc. Subscribers (each with one share) are: J. A. Barham, J. W. French. The first directors are not named.

Number Changed

The Trent Valve Co. Ltd., of 47 Great Eastern Street, London E.C.2, has changed its telephone number to Bishopsgate 7309.

Company News

British Xylonite Company

A forecast made by Mr. C. F. Merriam, chairman of the British Xylonite Company (manufacturers and manipulators of plastics), was fulfilled in 1954 by a 20 per cent increase in sales. The combined trading profits for the year amounted to £1,179,862 against £823,533 for 1953, and after tax deduction the consolidated net profit was £360,726, which is more than double the figure for the previous year. British Xylonite Company's share of net profit was £231,283, as against £159,795 in 1953. The substantial improvement was due to the recovery of BX plastics sales which increased by nearly 45 per cent. The company's annual general meeting will be held 31 May at Highams Park, London E.

Shell Transport & Trading Co. Ltd.

A statement issued by Sir Frederick Godber, chairman of the Shell Transport & Trading Co. Ltd., reveals that capital expenditure of the Royal Dutch/Shell Group last year was £226,000,000 of which £57,000,000 was spent on oil refineries and chemical plants. The Shell Transport & Trading Co. Ltd. holds a 40 per cent interest in the Royal Dutch/Shell Group. The annual general meeting of the Shell Transport & Trading Co. Ltd. will be held 1 June at the Chartered Insurance Institute, 20 Aldermanbury, London E.C., and the directors have recommended a final dividend of 2s. per £1 unit free of income tax which, if approved, will be payable on 8 June and will absorb £6,541,763.

International Paints

A final dividend of 14 per cent, making 20 per cent less tax, on the ordinary for 1954, is recommended by the directors of International Paints (Holdings). This is at the same rate as for 1953, but is payable on the capital of £2,138,000 as increased by the one-for-three scrip issue last June. Group profit, after all charges, but before taxation, was £1,379,019 compared with £1,376,045 in 1953.

British Petroleum Company

Preliminary figures issued by the British Petroleum Company show that group net profit for 1954 was £24,349,873, an increase of £760,439 over the previous year. The annual meeting will be on 9 June, and a final dividend of 14 per cent on increased capital is recommended. The total payment will be equivalent to 15 per cent on the present capital, compared with the equivalent of 8½ per cent for 1953.

A. B. Fleming Profits Up

The directors of A. B. Fleming (Holdings), oil and colour manufacturers, have recommended a final dividend of 8 per cent, making

12 per cent (less tax), on the £1,000,000 one-class capital for the year to 31 March, 1955. This compares with a total of 13 per cent for the previous year, of which a 5 per cent interim payment was made on a capital of £550,000 prior to a nine-for-eleven scrip issue. The total payment absorbs £68,000, against £59,125, and it is proposed to repeat the 1 per cent dividend from capital reserve, amounting to £10,000. Group profit for the year, after all charges, but before taxation, has advanced from £413,914 to £487,340. Taxation requires £244,426, compared with £239,591, leaving a net profit of £242,914 against £174,323. The 5s. units were unchanged at 10s. 7½d.

Albright & Wilson

The directors of Albright & Wilson announce that Treasury consent has been granted to the issue by way of capitalisation of reserves of one 5s. ordinary share (to be converted into stock) for every two 5s. ordinary stock units already held. It is intended that the issue be made to stockholders on the register at the close of business on 24 May, 1955. An extraordinary general meeting will be held immediately after the annual general meeting on 2 June 1955, for the purpose of passing the appropriate resolutions.

Bakelite Ltd.

Bakelite surpassed its previous highest volume of sales in 1954, says the statement by the chairman, Mr. H. V. Potter. Trading profit for the year was £648,829, compared with £332,367 for 1953. Sales of phenolic resins for the older applications more than held their own, while increased sales were reported for newer applications. The main contribution again came from the phenolic thermosetting division, although the greatest expansion during the year was in the sale of Vybak materials. A final dividend of 11 per cent is proposed for the annual general meeting on 9 June. This will make a total payment for the year of 16 per cent, compared with 12½ per cent for 1953.

Dunlop

Dunlop announce a group trading balance of £17,717,914 for last year as against £15,488,545 for 1953, and an available net profit of £4,858,500 as against £4,953,986. The directors recommend a final dividend of 10 per cent less tax, making, with the interim dividend, 14 per cent for the year as against last year's 12 per cent plus 2 per cent bonus.

Honeywill-Atlas

The Atlas Powder Company of the US and Honeywill & Stein of London have formed a jointly-owned company, Honeywill-Atlas, to make available from sterling sources sorbitol and a wide range of Atlas surface active agents. The notice under this heading in our issue of 30 April, which stated that the company would produce sorbitol in this country, was not strictly correct.

British Aluminium Company

Manufacturing and trading profit of the British Aluminium Company in 1954 was £1,999,633, £1,117,516 greater than in the previous year, owing largely to increased sales of semi-fabricated products. Consolidated net income for the year, after tax, amounted to £733,821, compared with £409,699 for 1953. At the alumina works technical developments have increased the level of output and helped to hold down the level of costs. Reconstruction plans at Kinlochleven and Lochaber are nearing completion, and metal output for 1954 exceeded that for 1953. Development work has proceeded actively in a number of fields and has been directed towards new uses and the expansion of existing uses. At the annual general meeting on 3 May a final dividend of 8 per cent, making 12 per cent for the year, was approved.

Boots Pure Drug Co.

Group profits, before tax, of Boots Pure Drug Co. were £4,214,758 (subject to audit) for the year ended 31 March. This compares with £3,116,451 for the previous year. It is proposed to pay a final dividend of 17½ per cent, making a total of 27½ per cent. Last year's payment totalled 22½ per cent.

C. A. Parsons & Co.

Group output of C. A. Parsons & Co. during 1954 was again a record. Trading profit was £3,026,218 (£2,382,843) and net profit, after tax, £1,474,844 (£809,833). The directors of the company have taken the initiative with a number of companies possessing specialised and appropriate experience or manufacturing facilities to form a separate corporation which will concentrate on the design and construction of nuclear power plants in any part of the world. During 1954 a long-term agreement for future collaboration was made between Head, Wrightson & Co. and C. A. Parsons.

Y. PICOLINE

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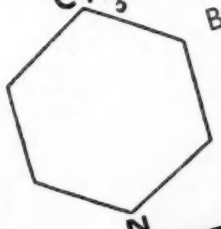

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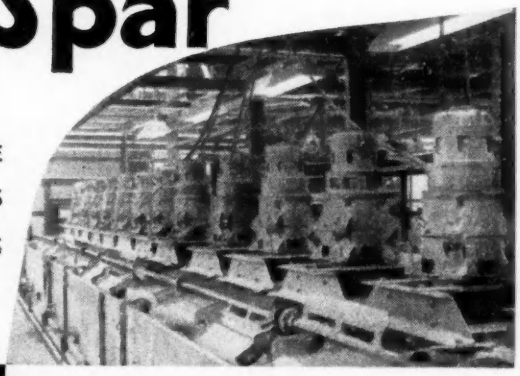

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Next Week's Events

TUESDAY 17 MAY

Institute of Metal Finishing

Torquay: Palace Hotel. Annual conference (until 21 May).

WEDNESDAY 18 MAY

Royal Society of Arts

London: John Adam Street, Adelphi, W.C.2, 2.30 p.m. 'Some Recent Developments in the Chemistry of Nucleic Acids' by Sir Alexander Todd.

Chemical Society

Leeds: Department of Chemistry, The University, 10 a.m. Official meeting and symposium on 'The Friedel-Crafts Reaction.'

THURSDAY 19 MAY

Chemical Society

Leeds: Chemistry Lecture Theatre, The University, 6.30 p.m. Centenary lecture: 'Chemical Effects of Steric Strains' by Professor H. C. Brown.

SCI Agriculture Group

Hurley, Berkshire: Grassland Research Station, 2.15 p.m. Annual summer meeting.

FRIDAY 20 MAY

Chemical Society

Dublin: Chemistry Department, Trinity College, 7.45 p.m. 'Some Applications of Flame Photolysis' by Professor R. G. W. Norrish.

Society of Cosmetic Chemists of Great Britain

London St. Ermin's Hotel, Caxton Street, S.W.1, 7 p.m. Annual general meeting.

Society for Analytical Chemistry

Ardeer: I.C.I. (Nobel Division), 10.30 a.m. Joint symposium of Scottish Section and Microchemistry and Physical Methods Groups on 'Gas Chromatography.' Afternoon tour of laboratories.

Swansea: University College. Western Section summer meeting (also on 21 and 22 May).

Changes of Name

The following changes of name have been announced: THOMAS BENTLEY & SON LTD. to THOMAS BENTLEY & SON (GLYCERINE) LTD., on 7 March; BUXTON PEAT MANATTONE LTD. to SAMUEL & SON (MOULDERS) LTD., on 7 March.

Market Reports

LONDON.—Active conditions persist on the industrial chemicals market and a good flow of inquiry for export has been reported. There has been a steady demand for the heavy chemical products, and available supplies of most of the soda and potash products have no difficulty in finding an outlet. Contract deliveries to the textile industries have also been on a good scale. Formaldehyde, hydrogen peroxide, borax, boric acid and the solvents are all moving well, and the demand for fertiliser materials remains fairly good. Ephedrine hydrochloride of a purity not exceeding 95 per cent has been exempted from Key Industry Duty until 18 August. Conditions on the coal tar products market are unchanged with most items firm against a good demand.

MANCHESTER.—Traders on the Manchester chemical market during the past week seem to have had little cause for complaint regarding the rate at which contracts are being drawn against by leading consumers of the alkalis and other products in Lancashire and the West Riding. Fresh inquiries and actual new bookings have been on a fair scale and have covered a wide range. Prices generally are well maintained. Among the fertilisers there is a steady call for the compound and the concentrated descriptions and also for sulphate of ammonia, with a fair business in superphosphates. Most of the end tar products are being taken up in good quantities.

GLASGOW.—In general the past week opened in a brisker trend, which was maintained during the week for industrial chemicals, and on the whole a reasonable week's trading has to be reported. The demand for agricultural chemicals is still good. With regard to export, this market has been extremely lively.

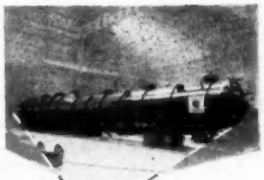
Electronics Advertising

Technical Designs Ltd., 46 Brook Street, London W.1, announce the opening of an electronics department covering every application of this fast growing science.

This organisation specialises exclusively in the various forms of technical publicity technical instruction books, brochures, films and slides. Their work is used by many well-known British companies and by Government departments.

EXTENSIONS EXTENDED

to deal with the demand from the gas, chemical and petro-chemical industries to produce large vessels.



Photograph shows welded wet vacuum column for petroleum re-distillation unit. 5 feet to 7 feet dia. 59 feet long

The second major extension to the Stockton workshops gives a total of 247365 superficial feet all under cover. Fabrication is undertaken in mild and special steels, if necessary, to Lloyds Class 1 standard, Admiralty Grade A standard, A.P.I.-A.S.M.E. Code, A.O.T.C. standard.

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CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive, or a woman aged 18-59 inclusive, unless he or she, or the employment, is excepted from the provisions of the Notifications of Vacancies Order, 1952.

MANAGERIAL PERSONNEL NEEDED FOR RESEARCH CENTRE IN THE PETROLEUM INDUSTRY

ENTE NAZIONALE IDROCARBURI (E.N.I.) has under its supervision a number of Italian Companies active in the field of petroleum and petrochemicals. E.N.I.'s major activity is centred in the following items :—

— gas and oil field exploration and exploitation (current production : 105 billion cu. ft. of natural gas per year) ;

— operator of a 2,500-mi. pipe-line system (capacity, over 700 million cu. ft. per day) ;

— owner and operator of a tanker fleet of around 120,000 dwt. ;

— owner and operator of an extensive network for distribution of petroleum products and LP-gas throughout Italy (64 bulk plants, 4,000 stations, etc.) ;

— control over or shareholding in refineries having a processing capacity of about 6 million tons of crude oil per year ;

— owner of factories (1,500 employees) for construction of machinery ;

— shareholding of chemical plants (700 employees) for production of synthetic dyes, detergents, etc. ;

— under construction, a petrochemical plant (production capacity : 30,000 tons per year of synthetic rubber and 350,000 tons per year of ammonium nitrate).

E.N.I. is organising a big research centre for investigation and development of petroleum processing and manufacture of petrochemicals. Some departments are expected to begin operation next summer.

Italian or foreign technical experts, with a wide educational background, specific training, organisational and managerial ability, are required to fill positions as heads of the main departments of the laboratories.

Specifically, the following are sought :—

(1) **CHEMIST** or **PHYSICIST** with specific knowledge and experience in thermodynamic and chemico-physical problems ;

(2) **CHEMIST** specialised in the preparation of organic compounds, particularly those derived from hydrocarbons ;

(3) **INORGANIC CHEMIST,** soundly and completely acquainted with modern methods of experimentation, research and testing ;

(4) **ENGINEER** or **INDUSTRIAL CHEMIST** specially trained in the methods for improving petroleum products applications ;

(5) **ENGINEER** or **PHYSICIST,** with physico-technica and technological training, specialised in the problems of thermo-technics, measurements and controls ;

(6) **ENGINEER** or **INDUSTRIAL CHEMIST** with extensive research experience in the field of crude oils processing ;

(7) **ENGINEER** or **INDUSTRIAL CHEMIST** particularly experienced in extending laboratory procedures to pilot plants ;

(8) **ENGINEER** with good theoretical knowledge and laboratory experience in engine tests on fuels and lubricating oils ;

(9) **ENGINEER** or **INDUSTRIAL CHEMIST** specially trained both in theory and practice in the fields of corrosion and protective means for materials.

Note.—University degree mandatory.

Applications should state age and other usual personal data, educational background and qualifications, practical experience, etc., and should include a photograph. Please address personally to :

THE PRESIDENTE
DELL'ENTE NAZIONALE IDROCARBURI,
VIA LOMBARDIA, 43,
ROMA,
ITALY.

with the special note RISERVATA PERSONALE (i.e., to be opened by addressee only).

Absolute discretion in every respect is assured.

Salary offered will be in accordance with position, training and qualities required.

GOVERNMENT OF UGANDA

A VACANCY exists for a Government Chemist in Uganda (BCD117/9/012).

QUALIFICATIONS.—F.R.I.C. (Branch E Food and Drugs), B.Sc. (Chemistry), 1st or 2nd Class Honours Degree, three years' experience of analytical work in Applied Chemistry.

DUTIES.—Routine chemical estimations and investigations, teaching of African staff ; care and accounting for Government stores and giving expert advice in Court. Duties may also entail travelling.

TERMS OF APPOINTMENT.—On pensionable terms or on contract for a tour of 30-36 months with emoluments in the scale £852-£1,620, plus a temporary non-pensionable allowance of 10 per cent with a maximum of £162 per annum. For contract appointment, a gratuity of 13½ per cent of total emoluments, excluding allowances, is payable on satisfactory completion of contract. Outfit allowance of £30 if initial salary is below £882. Free return passages for officer, wife and children. Furnished quarters at low rental. Income tax at local rates.

Apply, in writing, to the **DIRECTOR OF RECRUITMENT, COLONIAL OFFICE, GREAT SMITH STREET, LONDON, S.W.1,** giving briefly age, qualifications and experience. Mention the reference number BCD117/9/012.

ORGANIC CHEMIST. A position is available for a Graduate with a sound University background (Ph.D.) and plenty of initiative, in charge of research and development. Salary commensurate with age and experience. Previous experience in industry may be an advantage but is by no means essential. Write, in strictest confidence, for form of application, to the **MANAGING DIRECTOR, THE BAXENDEN CHEMICAL CO., LIMITED, CLIFTON HOUSE, 83-117, EUSTON ROAD, LONDON, N.W.1.**

QUALITY CONTROLLER for Paper Mill on shift basis. Chemistry to H.N.C. or Inter. B.Sc. Experience of paper industry not essential, but must have completed Nat. S. Details of education and experience to **EMPIRE PAPER MILLS LTD., GREENHITHE, KENT.**

WORKS Chemist requires an **ASSISTANT** for Production Control and Development Work on Plastic Compounds. Experience in milling P.V.C. materials essential. Please write stating age, experience and qualifications, to **BOX No. C.A. 3406, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

UNILEVER LIMITED has vacancies for qualified **CHEMICAL** and **MECHANICAL ENGINEERS** in the **DEVELOPMENT DIVISION** of its Research Department at Port Sunlight, near Birkenhead.

The Division is engaged in the design, construction and operation of pilot scale process equipment for the manufacture of vegetable oil, detergent and chemical products marketed by Associated Companies of Unilever both in the United Kingdom and overseas. Its staff collaborates in commissioning factory plants transferred from pilot scale development projects.

These appointments offer opportunities of creative and satisfying work. In due course those appointed will be eligible for promotion either in Development Division or in the factories of the Unilever Organisation. There are excellent prospects of making interesting and successful careers in this organisation.

Candidates should be highly qualified, have initiative and an original approach to problems.

There are vacancies for men up to 35 who have had considerable industrial experience and also for those who have qualified recently with starting salaries ranging up to £1,500 p.a. for the former and from £700 p.a. upwards for the latter.

Successful candidates will be eligible for membership of the Company's Superannuation Fund and Widow's Pension Scheme.

Please apply to: Personnel Division (WAD 84), Unilever Ltd., Unilever House, London, E.C.4, giving full information of age, qualifications and experience.

GOVERNMENT OF UGANDA

A VACANCY exists for a Nutritional Chemist in the Department of Veterinary Services and Animal Industry, Uganda. Age limit, 35 years. Male and female candidates will be considered.

QUALIFICATIONS.—Honours Degree in Chemistry or Associateship of the Royal Institute of Chemistry. Post-graduate work in the nutritional field or plant chemistry an advantage.

DUTIES.—Investigation of the nutritional value of local foodstuffs and metabolism studies of indigenous farm livestock.

TERMS OF APPOINTMENT.—On pensionable terms, or on contract for one tour with option to transfer to pensionable staff, with emoluments in the scale £816-£1,620 per annum, plus cost-of-living allowance of 10 per cent of salary. Gratuity at rate of 13½ per cent of emoluments (excluding cost-of-living allowance) payable on satisfactory completion of contract. Outfit allowance of £30. Furnished quarters at a rental between £33 and £102 per annum, according to grade. Free passages. Free medical and dental treatment. Generous leave. Income tax at low local rates.

Apply, in writing, to the **DIRECTOR OF RECRUITMENT, COLONIAL OFFICE, GREAT SMITH STREET, LONDON, S.W.1,** giving briefly age, qualifications and experience. Mention the reference number BCD67/9/09.

COUNTY BOROUGH OF BRIGHTON
WATERWORKS DEPARTMENT
APPOINTMENT OF ASSISTANT CHEMIST AND BACTERIOLOGIST (MALE OR FEMALE)

APPLICATIONS are invited for the above appointment at a salary in accordance with Grade III (£600-£725) of the National Joint Council Scales for Administrative, Professional and Technical Staffs. Applicants should possess either a Degree in Chemistry or A.R.I.C. Waterworks experience is desirable but not essential.

Appointment superannuable and subject to medical examination, terminable by one month's notice on either side.

Form of application can be obtained from Waterworks Engineer, 12, Bond Street, Brighton, to be returned, suitably endorsed, by May 28, 1955.

W. O. DODD,
Town Clerk.

Town Hall,
Brighton, 1.
April, 1955.

SITUATION WANTED

QUALIFIED CHEMICAL ENGINEER, aged 30, experienced in plant control, design, and development, requires situation with Chemical Plant Manufacturers. Apply, **BOX No. C.A. 3405, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

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CHARCOAL, ANIMAL AND VEGETABLE horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—**THOS. HILL-JONES, LTD., "INVICTA" WORKS, BOW COMMON LANE, LONDON, E. TELEGRAMS: "HILL-JONES, BOCHURCH LONDON." TELEPHONE: 3285 EAST.**

COMPLETE DRYING PLANT by Richard Simon of Nottingham, comprising size 2a Patent Tubular Drier, approx. 14 ft. long × 5 ft. deep × 3 ft. 9 in. wide complete with piping and cyclone separator, pneumatic conveyor, feed bucket elevator. Fully motorised. Apply: **G. COHEN SONS & CO., LTD. 58 WOOD LANE, LONDON, W. 12,** Tel. She. 2070 and **STANNINGLEY, NR. LEEDS.** Tel. Pudsey 2241.

ECONOMIC BOILERS. Two 8 ft. diam., 220 lb. w.p., 5,000 lb. evaporation; three 7 ft. 6 in. diam., 160 lb. w.p., 4,500 lb. evaporation; 400 other boilers in stock.
STAINLESS PRESSURE TANK, 19 ft. by 5 ft. diam., 110 lb. w.p. Unused.
TWO 35 ft. long by 9 ft. diam. Lead-lined **TANKS.**
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FORTY Riveted **RECEIVERS,** 8 ft. 6 in. long, 5 ft. 6 in. diam., 75 lb. w.p. Numerous other sizes.
Solid Drawn **STEEL PIPES,** 6 in., 8 in., 10 in., 12 in., 14 in., thousands of feet in stock, plain and flanged.
CAST-IRON PIPES, 1,200 yds. 10 in. and 400 yds. 8 in., **NEW.** Also most other sizes, up to 24 in. bore.
VALVES in Stainless, Gunmetal, Enamel Lined.
CAST-IRON TANK PLATES, 2 ft. square. 500 in stock.
FRED WATKINS (BOILERS), LTD., COLEFORD, GLOS.

SACK AND BAG MERCHANTS AND MANUFACTURERS. New and reconditioned for Home and Export. (Use **JUTEX** for sack repairing). **ALTRINCHAM JUTE LTD., WRIGHT STREET, BROADHEATH, ALTRINCHAM, CHESHIRE.** ALTrincham 4360.

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MORTON, SON AND WARD, LIMITED,
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100 G., 150g. and 200g. **JACKETED PANS**—new, in mild steel, for 100 lb. w.p. Mixing gear fitted if required.

3 cwt. **TROUGH MIXERS** by **CHALMERS and GARDNER**—stainless steel lined troughs.

50/100g. heavy duty **MIXERS** by **FALLOWS AND BATES**—agitators driven through bevel gears from fast and loose pulley.

200g. cast-iron **JACKETED MIXING VESSEL** with nickel-chrome impellor type agitator driven through bevel gears from fast and loose pulley.

25g. and 50g. **TILTING TROUGH MIXERS** by **RICHMOND & CHANDLER**—double " Z " blades. Stainless steel interior.

One **NEW STAINLESS STEEL JACKETED PAN**—mounted on stand. 40 lb. w.p. in jacket.

A selection of new **MONO** and other second-hand **PUMPS** in stock.

Inquiries invited.

MORTON, SON AND WARD, LIMITED
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TWO BRAND NEW STERILISING VESSELS—7 ft. long by 3 ft. diameter.

One **S. J. WERNER MIXER** with pan approx. 2 ft. by 2 ft. of the tilting type.

Two steam jacketed **CAST-IRON FILTER PRESSES**—each with 38 s.j. plates and 39 frames, cake size 2 ft. 4 in. square.

Several **JOHNSON CAST-IRON FILTER PRESSES**—various sizes and types.

GARDNER MIXERS and Mixers and Sifters combined, sizes " E," " G," " H " and experimental.

HYDRO EXTRACTORS—24 in., 30 in. and 36 in.

Two Gardner " H " size Steam-jacketed **MIXERS.**

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Two No. 4 **SUPER MIRACLE MILLS** with motors and starters.

Three Single-effect **EVAPORATORS** by Scott, with pumps and motors.

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STORAGE TANKS FOR SALE

HORIZONTAL CYLINDRICAL
500 gallon to 12,000 gallon ; new and second-hand.

VERTICAL CYLINDRICAL
250 gallon T.V.O. to 9,000 gallon.

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100 gallon to 1,200 gallon ; new and second-hand

OVAL LORRY MOUNTING
200 gallon to 4,000 gallon ; all types.

FULL LIST ON REQUEST.

WILLIAM R. SELWOOD, LTD.
CHANDLER'S FORD,
HANTS.
'Phone 2275.

FOR SALE—Lister 4-cylinder Diesel Engine, direct coupled to Metro-Vick Alternator, 440v. 3 ph. 50 cycles, 4-wire with switch panel. Can be seen running, by appointment. Also separate 35 KVA Alternator 440v. 3 ph. 50 cycles, 4-wire with panel. **WARRINGTON CANNERS, LTD., RIVERSIDE WORKS, PENKETH, WARRINGTON.**

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COMPLETE VACUUM DRYING PLANT by Scott—comprising horizontal band drier, approx. 35 ft. long by 6 ft., with service feed hoppers, shaker feeder, condensate receivers for hotplates, vacuum augmentor, kek mill, screening and finished material hoppers, tailings elevator, wet and dry vacuum pump. Fully motorised. Drier of the 7-band type, but has operated with three bands only.

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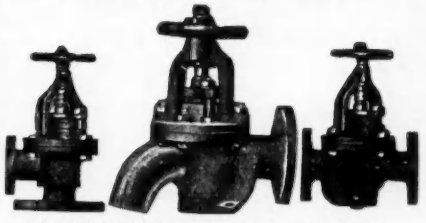
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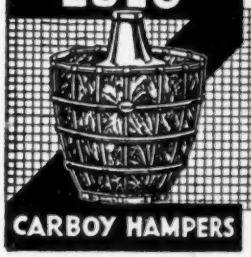
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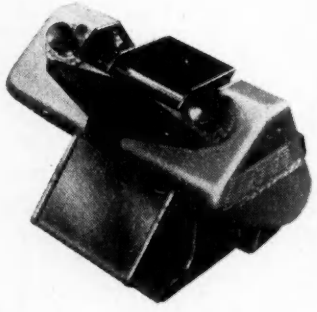

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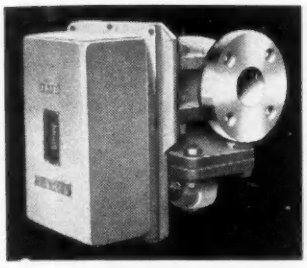

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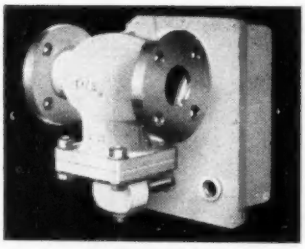

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